DIVISION OF THE HUMANITIES AND SOCIAL SCIENCES

CALIFORNIA INSTITUTE OF TECHNOLOGY

PASADENA, CALIFORNIA 91125

COMMODITY AGREEMENTS AND THE NEW INTERNATIONAL ECONOMIC ORDER

David L. McNicol

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CHAPTER 1

THE INTERNATIONAL DEBATE ON COMMODITIES

While commodity problems have been on the agenda of international affairs for decades, it is only recently that they became a major issue. The heightened visibility of commodities problems can to a large extent be attributed to the success of OPEC in quadrupling the price of oil. The large increases in commodity prices during 1972-74, and their subsequent decline, and several other events also played a role. These factors, however, are of a transitory nature. The persistent cause of the increased importance of commodity policy has been the emergence of the Third World nations as an effective bloc. Fifteen years ago, international relations revolved around the East/West confrontation, and commodity problems were of minor significance to the developed nations. Commodity policy is now recognized as a major issue largely because it involves the danger of a confrontation between the industrialized nations of the North and the largely underdeveloped nations of the South.

During the past few years the debate on commodities problems has centered on a set of proposals -- called the Integrated Programme for Commodities -- advanced by the less developed nations (LDCs). The developed countries (DCs), and especially the United States, have been in the position of responding to the LDCs'

proposals. Both the initiative and the response have been largely conducted within the U.N. General Assembly and the U.N. Conference on Trade and Development (UNCTAD). Action on commodities can not be negotiated within the U.N. General Assembly or UNCTAD. Nevertheless, debates conducted within these organizations and resolutions adopted by them have had a significant effect on forcing and directing action.

This chapter reviews the debate on commodities policy as it has evolved over the past several years. The objective of the discussion is only to describe the positions adopted by the LDCs and the DCs and to identify the issues. Some of the difficult factual and analytical questions that come up in the debate on commodities policy are the subjects of succeeding chapters.

THE LDCs' PROPOSALS

The appearance of the LDCs as a coherent bloc is usually dated to the first UNCTAD, held in 1964. UNCTAD is an organ of the U.N. General Assembly. As such, it includes all member nations and is not formally concerned only with the problems of the LDCs. However, UNCTAD is widely regarded as an organization ". dedicated to exerting pressure on the advanced countries to adapt their policies to the needs of the developing countries."[1]

In conjunction with UNCTAD, the LDCs formed the Group of 77(G-77), which now includes approximately 112 nations.[2] While its members have shown a remarkable degree of cohension, G-77 is not an alliance or even a formally established organization. G-77 is best

regarded as a political party. It has taken the lead in obtaining a consensus among the LDCs and in advancing proposals of interest to the LDCs -- in particular, the Integrated Programme (IP).

The current debate on commodities had its specific origins in a statement, issued by G-77 in 1973, calling for a "new international economic order." This statement set out the broad objectives and principles that guided the development of the IP. At the U.N. General Assembly Special Session on Raw Materials and Development, held during April and May, 1974, the LDCs successfully pressed for the adoption of the "Declaration on the Establishment of a New International Economic Order." The Special Session also approved a "Program of Action on the Establishment of a New International Economic Order,"[3] which directed the UNCTAD Secretariat to develop specific measures along the lines set forth in the resolution and the "Declaration on the Establishment of a New International Economic Order." Over the year that followed, the UNCTAD Secretariat, in response, developed the Integrated Programme for Commodities.[4]

The intellectual background to the IP lies in the "new international economic order" (NIEO).[5] This is a complicated set of ideas. NIEO is in part an expression of the LDCs economic and political aspirations; in part a statement of principles on the means of international cooperation; and, in part, a theory of the role of trade, especially trade in commodities, in economic development.

The "Declaration on the Establishment of a New International Economic Order" contained three major points. First, it asserted that the LDCs should retain sovereignty over their natural resources. Second, the declaration stated a need for improved terms of trade for raw materials producers; i.e., higher prices for raw materials relative to manufactured goods. Third, the declaration called for increased transfers of resources to the developing nations. These bald points do not, however, convey much of the sense of the NIEO.

Spokesmen for the LDCs do not use the term "economic order" to refer primarily to the markets, government policies and multinational institutions which now mediate international exchange. Instead, they use this term to refer to the existing distribution of income among nations. In the eyes of the LDCs, the existing "order" is characterized by the fact that 70 percent of the world's population lives in the LDCs while these people obtain only 30 percent of world income. A new "order" would, correspondingly, be a situation in which income was much more evenly distributed.

NIEO is also associated with some specific propositions on the role of markets in development. The LDCs argue that instability in commodity prices, and a consequent instability in their export earnings, is a major obstacle to development. Second, the LDCs argue that the terms of trade have shifted against commodities, and in favor of manufacture, and that this trend can be expected to continue. Both of these points, if correct, imply limitations on the commodities markets as engines of development.

A third position, shared by many, although by no means all, of the LDCs, is a hostility to private foreign investment. In some cases, this simply reflects doctrinal considerations. In other cases, there is a fear of domination by foreign business. Beyond this, there is some concern that relatively short-term market forces can lock a country into an undesirable position from which it is difficult to escape. In particular, the LDCs are concerned about their dependence on commodities.

These arguments serve as a bridge from the NIEO, as a broad statement of political purpose, and the objectives of a specific program on commodities. The LDCs argue that an international program on commodities should attempt to stabilize commodity prices and shift the terms of trade in favor of commodities; i.e., increase commodity prices relative to the prices of manufactured goods. The LDCs also have a predisposition in favor of direct market intervention by an international organization.

The central feature of the IP is a set of commodity agreements. Agreements would initially be created for eighteen commodities:[6] bananas, bauxite, cocoa, coffee, copper, cotton and cotton yarn, hard fibres and products, iron ore, jute and products, manganese, meat, phosphates, rubber, sugar, tea, tropical timber, tin and vegetable oils. The IP envisions the possibility that agreements would eventually be negotiated for other commodities as well. "Commodity agreement" refers to agreements which create an international organization of both buyers and sellers which is intended to take an active role in the market.[7] The International

Commodity Organization (ICO) created can be given a variety of different roles and powers. In short, "commodity agreements" and ICO are generic terms that include many different types of operations.

The IP's commodity arguments would, if possible,[8] be built around buffer stocks managed by the ICOs. In principle, a pure buffer stock is a device for reducing period-to-period variations in commodity prices. The ICO would purchase the commodity in periods of slack demand so as to support a floor price, which would be stated as some percentage of a target price. The stock acquired in slack periods would be sold off in periods of short supply, thereby defending a ceiling price.

While the IP's commodity agreements would include buffer stocks, the agreements envisioned in the IP would be very far from pure buffer stocks. First, the documents that describe the IP indicate that a primary purpose of the agreements would be to increase commodity prices.[9] That is, the target prices for the buffer stocks are to be set above the price that would prevail in a free market with many buyers and sellers.[10] Furthermore, the IP's commodity agreements would provide for the imposition of export quotas and production controls. These would not be used simply on a standby basis but would be a permanent feature of the markets. That is, the amount that each producer could produce and export would be negotiated within the ICO. As is argued in Chapter 3, the net result is commodity agreements more nearly like OPEC style cartels than pure buffer stocks.

The IP's commodity agreements would be related by a "Common Fund." The Common Fund, which would be an organization distinct from the ICOs, would have three functions. First, it would finance the buffer stocks; i.e., serve as a pool of money and/or credit which would be used to acquire stocks as market conditions require, with repayment made when the stock is sold off. The funds would be provided by both buyers and sellers.[11] Second, the Common Fund would have the right to function as a buffer stock for commodities not covered by an agreement. Third, the Common Fund could take the initiative in organizing commodity agreements. The relevant documents also hint that the Common Fund might develop into a central management for the various ICOs.

The Common Fund is by far the most controversial feature of the IP. Pushed to its limits, the Common Fund would be something like an International Department of Agriculture and Minerals. The vision seems to be of intervention in the world commodity markets along the lines of the domestic agricultural programs of the 1950s.

THE U.S. RESPONSE

The major features of the IP -- including the idea of a Common Fund -- were not new.[12] International agencies have issued a steady stream of reports on ideas associated with the IP. For example, the effect of instability of export earnings on development has been discussed since the days of the League of Nations and interest in proposals to "stabilize" commodity prices go back at

least as far. Since the late 1940s, these proposals have been considered by various international agencies and they played a prominent role in UNCTADs held in 1964, 1968 and 1972.

The U.S., along with the other DCs, has generally opposed proposals along the lines of the IP. This opposition was at times active; for example, the U.S. along with most of the other DCs, voted against or entered reservations on the Resolution on Commodities presented at UNCTADs and similar resolutions presented to the U.N. General Assembly. More often, the DCs' opposition was implicit in a lack of interest in the LDCs' proposals. The DCs were unwilling to take up these proposals and develop them.

The U.S. began to alter its posture on commodity problems during 1974-1975. While the U.S. did not accept the IP, it attempted to respond to the concerns of the LDCs. This change was apparently prompted by the pressures of altered circumstances on two well established policies.

The first of these -- which is so basic that it is easy to overlook -- is the commitment of the DCs to international cooperation; i.e., the use of diplomatic means, including the U.N. and other multinational agencies, to resolve or dampen international conflicts. The tangled relationships of the Western democracies with China and the U.S.S.R. remains the primary concern, but over the past decade, the possibility of a serious North/South confrontation has evolved. The U.S. might have chosen to act unilaterally on the issues involved, or to act in concert with the other DCs, or to simply ignore the discussions of commodities in the

U.N. and UNCTAD. But the presumption in favor of seeking cooperative solutions would argue against these courses. One of the goals of U.S. policy was to find non-combative means of resolving the conflicts between the DCs and the LDCs.[13]

Second, the U.S. and the other DCs have accepted a responsibility for assisting the economic development of the LDCs. This responsibility has been formally made and renewed on many occasions. It is possible to question the extent of the DCs' commitment and the effectiveness of existing development assistance programs, but the DCs' acceptance of a policy of aiding the LDCs is well established.

The two decades after World War II were the era of foreign aid. The U.S. inaugurated the Marshall Plan in 1947. While foreign aid was not unknown before then, the size and scope of the Marshall Plan was unique. It was the first real effort at foreign aid, and because the Marshall Plan was highly successful, it became something of a model. A variety of bilateral programs for the LDCs -- the Marshall Plan was aimed at Europe was developed and in the late 1950s the emphasis began to shift to multilateral aid programs.

Development assistance programs have not, however, succeed in producing self-sustaining growth in the LDCs. The failure to a considerable extent lies in the structure of existing programs. While these flaws might be corrected, and the notion of foreign aid salvaged, the level of funding is a more intractable problem. It is generally conceded that the current spending on

development assistance is much less than would be required to provide rapid economic growth in the LDCs and, more important, that the political situation in the DCs is such that development assistance will not increase significantly.

This is a crucial point. Both the plans advanced by the LDCs' and the DCs' responses are cast against existing limitations of development assistance.[14] They assume a commitment on the part of the DCs and assume that this commitment cannot be met through increases in development assistance. The point of departure is: if not development assistance, then what?

The U.S. response to the IP was set by Secretary of State Kissinger in a speech to the Seventh Session of the U.N. General Assembly in September, 1975.[15] The U.S. adopted a "positive attitude," in two respects. First, and perhaps ultimately the most important, the U.S. agreed that the full range of commodity problems perceived by the LDCs, were an important item for international action. Second, the U.S. offered a set of proposals -- in effect, a counterplan -- that responded to the underlying concerns of the LDCs.

The U.S. accepted the contention that instability in export earnings is a significant impediment to development, but argued that this problem was best dealt with by a system of compensatory financing handled through the International Monetary Fund. Compensatory financing is a means for more or less automatically transferring funds to a country whenever export earnings fall below some pre-specified level.[16] For example, if the established

base level of earning for some year is $100 million, and actual earnings are $90 million, then -- subject to certain limitations -- $10 million would be transferred to the country. The amount transferred would be repaid in years when export earnings were above trend or, in some cases, converted to a grant.

The second major part of the U.S. proposals respond to the LDCs' concern with the speed of their development. The LDCs argue that trade in commodities has not in the past, and will not in the future, provide a sufficient stimulus for growth. The IP's solution to this problem is commodity agreements designed to transfer income to the LDCs via higher prices for commodities. The increased earnings from commodity exports would then be used to finance investment. The U.S. took the position that using commodity agreements was neither a promising nor desirable means of speeding development. Instead, the U.S. proposed measures which would significantly increase the opportunities available to the LDCs.

One way to do so is to improve the access of the LDCs to the markets of the industrialized nations. This means a reduction in existing tariff and non-tariff barriers to trade. These barriers fall into three groups. First, most nations -- LDCs and DCs -- employ various non-tariff barriers to trade -- especially import and export quotas. Import quotas, of course, very directly limit the opportunities of foreign suppliers. Subsidies to domestic industries have a similar effect. Second, most nations set basic tariffs and then provide exceptions which favor particular trading partners. The U.S., for example, typically grants favorable

treatment to exports from Canada and the U.K. tariffs favor Commonwealth Nations. Such preferences, of course, discriminate against nations that are not favored. A third significant feature of tariff structures is "tariff escalation," which refers to increases in the tariff with the degree of processing. For example, the DCs' tariffs on copper ore, concentrate and refined copper are low zero in some cases -- while their tariffs on semi-fabricated copper products are typically in the range of 10-25 percent ad valorium. As a result, it is very difficult for those LDCs which produce copper to create domestic semi-fabricating industries.

Trade is one major source of funds for the LDCs. The other is capital flows, in various forms, from the DCs. Development assistance makes up roughly half of the capital flow from the DCs to the LDCs. This source of funds is not expected to increase significantly in real terms, and hence cannot be expected to provide the increased stimulus to development. Given this point, it is necessary to look for other sources of capital. The only "other source" apart from trade and development assistance is the private capital market. This is immense. For example, gross private domestic investment in the U.S. in 1971 was $209 billion. This is roughly five times the total value of the LDCs' commodity exports (excluding oil) and twenty times the amount of development assistance.

The obstacle to tapping the private capital markets is not a lack of economically sound projects. Underdevelopment is often described in terms of very low income levels, lack of basic services, underemployment and the painful social consequences of these

conditions. These descriptions are to the point, but it is also relevant to note that underdevelopment by its nature presents investment opportunities. There is a natural tendency for capital to flow from the developed nations, with their deep investment bases, to the LDCs. The underlying point is that the returns to capital tend to be highest where capital is most scarce.

The barriers to an increased flow of private capital to the LDCs are political in nature. Some LDCs encourage private foreign investment, a few forbid it and most fall somewhere in between these two extremes. Overall, the LDCs are cool to private foreign investment. The result of the LDCs' concerns, and actions, is a distinctly hostile investment climate. In particular, the wave of nationalizations that occurred during the late 1960s and early 1970s have made investments in the LDCs seem an unattractive proposition.

This situation cannot be easily resolved but it can be significantly ameliorated. The thrust of U.S. proposals in this area is to interpose multinational organizations between the private capital markets and investment projects in the LDCs. Specifically, the U.S. proposed an expansion of the International Finance Corporation and the creation of a new organization called an International Investment Trust. These organizations would serve as conduits for investment funds. From the point of view of the suppliers of funds, the multinational organization would serve to reduce the "political risks" of investment in LDCs -- i.e., the risk of expropriation. From the LDCs' point of view, channeling

funds through a multinational organization is to reduce the danger of domination by foreign corporations.

The three major elements of the U.S. program have been identified so far -- compensatory financing, trade liberalization and means for increasing the flow of private investment funds to the LDCs. If the U.S. program had been limited to these items, its relationship to the IP would be relatively straight-forward. The IP involves major, direct intervention in the commodity, while the U.S. programs attack the same problems with indirect means.[17]

The U.S., however, did not entirely oppose commodity agreements. Instead, the U.S. adopted the position that commodity agreements have a useful role to play in some cases and, hence, that commodity agreements should be considered on a case-by-case basis. The U.S. did not characterize the cases in which commodity agreements might be appropriate and, while rejecting higher commodity prices as a means of transferring income to the LDCs, the U.S. did not indicate what type of commodity agreements it regarded as acceptable. Furthermore, the U.S. agreed that instability in export earnings is a major obstacle to development[18] and agreed that a "comprehensive" approach to commodity problems was required. While the need for a system of commodity agreements does not inevitably follow from these propositions, they at least point in that direction. In short, U.S. policy on commodity agreements was at best ambiguous.

The U.S., nevertheless, opposed the IP. This fact was not spelled out at the Seventh Session of the U.N. General Assembly

but it became apparent at UNCTAD IV which was held in Nairobi in May, 1976. There were two key issues on commodities at UNCTAD IV. First, the LDCs pushed for the creation of agreements, under UNCTAD auspices, for each of eighteen commodities. Second, the LDCs proposed that these agreements be related by a Common Fund. The U.S. opposed both the creation of a Common Fund and prior acceptance of the creation of commodity agreements for a pre-specified list of commodities. The U.S. position at UNCTAD IV was not unanimously accepted by the other DCs. West Germany, Japan and the U.K. rejected, with varying degrees of strenuousness, the Common Fund. The other DCs were ready to accept -- with varying degrees of enthusiam and qualification -- the IP.[19]

STRUCTURE OF THE ISSUES

The debate on these issues reached a turning point -- presumably not the last -- at UNCTAD IV. The Plenary Session of UNCTAD IV accepted a "consensus"[20] Resolution on Commodities which laid down a time table for the creation of what would effectively be the Integrated Programme. The pivotal element in this time table is a negotiating conference on a Common Fund to be held in March, 1977. This conference would be preceded by two series of preparatory conferences. One of these would be concerned with the Common Fund. The other set of preliminary conferences would be called to produce drafts of agreements for each of eighteen commodities. These draft agreements would, after the negotiating conference on the Common Fund in March of 1977, become the basis

of negotiations for final agreements. The entire system is to be completed by the end of 1978.

It is not certain that this schedule will be maintained and there is even greater uncertainty about what the final results will be. Nevertheless, the U.S. program was shunted aside at UNCTAD IV and the IP advanced. The results of UNCTAD IV, then, force the question of whether the DCs, and especially the U.S., should agree to participate in a program along the lines of the IP.

Economic self-interest -- narrowly conceived -- is one relevant test of the desirability of participation in the IP. An economist or a cynic -- the two are not necessarily the same would be inclined to say immediately that the IP would not in the economic interest of the DCs, but there is some disagreement over this point. One popular argument holds that the DCs are dependent on raw materials supplied by the LDCs and hence that the LDCs have significant economic power over the DCs. The implication is, apparently, that the DCs must accept the IP. A bit of reflection is sufficient to indicate that this argument is grossly implausible. If the LDCs have the requisite power why don't they simply use it, as the OPEC nations did, to increase prices? In fact, apart from oil, the notion that the DCs are vitally dependent on raw materials supplied by the LDCs is largely false.[21] A second argument is that price stabilization benefits buyers as well as sellers. There are cases in which this is so, but the benefits would be small (cf. Chapter 4). Furthermore, the objective of the IP is not simply to reduce period-to-period price fluctuations but to

substantially increase commodity prices, and there is no doubt that higher commodity prices, as such, would be to the economic disadvantage of the DCs.

Whatever weight this conclusion finally receives, it is not overwhelming in terms of the international debate on commodities. The DCs have accepted a commitment to aid the economic development of the LDCs. This undoubtedly reflects a mixture of enlightened self-interest and humanitarian concerns. But whatever its source, the fact of the commitment poses this question: Is the IP a necessary or sound measure for speeding the development of the LDCs?

Stabilization of commodity prices appears, once again, as an aspect of this issue. As was noted above, it is argued that instability in the commodity markets, and a resulting instability in export earnings is a major obstacle to economic development. While this proposition sounds reasonable, the available evidence indicates that instability in export earning is not generally an obstacle to development (Chapter 2). The other, and more important, aspect of the question is whether higher commodity prices are a good way of transferring income to the LDCs. The economics of this issue is well established. Price increases are a grossly inefficient way of making income transfers in the sense that they cost the donors (buyers) much more than the beneficiaries (sellers) receive.[22] The means of making transfers by higher prices are, furthermore, an administrative nightmare, even when compared with foreign aid programs.

The conclusion of these comments is that, from the DCs' perspective, there is no sound economic case for a program along

the lines of the IP. Such a program would not be in the economic interests of the DCs and, would not be a good way of transferring income to the LDCs.

It follows that a rationale for an acceptance of the IP must lie in political considerations. The DCs have been and will be under strong pressures from the LDCs to accept the IP, and a rejection of the IP would probably entail some more or less immediate costs. However, the matter seems to be much less one of threat than of opportunity. The political value claimed for the IP is "cooperation." It is easy for anyone not attuned to international relations -- and perhaps especially an economist to miss the significance of that vague term. The opposite of "cooperation" is confrontation, which is a situation tending towards war. Many of the LDCs became independent nations only in the 1960s and the history of the nonaligned nations as a bloc goes back only a few years futher. How the LDCs, the DCs and the communist nations will adjust their relations remains an open issue. One very possible outcome is a period of intermittent war and terrorism. Given the relatively easy access to modern weapons, including nuclear weapons, this could be deadly for all nations.

The problem posed by the IP, then, would seem to be one of trading economic costs against political benefits. This view is acceptable, but, appearances perhaps to the contrary, it does not provide a quick step to a conclusion. The economic costs of a successful IP would be significant but manageable -- perhaps a fifth of those of OPEC. And the costs of a period of confrontation,

including episodes of terrorism and open war, would probably be larger, even if loss of life and social disruption are not counted. The IP would then be a bargain if it significantly increased the prospects for peaceful relations among nations.

The crucial difficulty with this argument lies in the assumption that the IP would promote cooperation. The IP is overtly a cooperative venture; but then so is marriage. The analogy is appropriate. Under the IP, a wide range of economic decisions -- on prices, inventories, investment, exports -- would be subject to negotiation within international agencies rather than made independently by firms and nations. There is no presumption that such a change would dampen, rather than heighten conflict, and no presumption that the institutions of the IP would be stable. Past history suggests, on the contrary, that commodity agreements designed to increase prices are devisive and unstable.

Whether the IP would promote cooperation is, then, a serious question. In terms of the DCs' acceptance of the program, it is perhaps the pivotal question.

CONCLUDING COMMENTS

The implications of the IP for international relations is not strictly a question of politics. The issue involves both political and economic elements. The connection between the two is reasonably straightforward. The IP would place international agencies over existing market institutions for some eighteen commodities, and relate these agencies by a Common Fund. The Common

Fund and the individual commodity organizations would have certain objectives and powers. It is possible to describe, using standard methods and results, what economic pressures and conflicts would be placed on these institutions. This information provides a basis for analyzing how the IP would function, whether it would be stable and, eventually, for assessing the likely political consequences of any program along the lines of the IP. To use an analogy, the task is much like that of a structural engineer trying to visualize a completed building on the basis of a blueprint.

Such, in brief, is the program of the remainder of the book. The discussions falls, logically, into two main parts. Chapters 2-5 are concerned with various specific aspects of commodity agreements. While these chapters explore several byways, their overall aims are first, to distinguish sharply agreements designed to increase prices from those designed to reduce price fluctuations and second, to assess the relevant characteristics of each type of agreement. Chapter 6 draws the conclusions reached in chapters 2-5 into an analysis of the IP's strategy and prospects and offers an assessment of some of its implications for international relations. The final chapter comments briefly on alternatives to the IP.

FOOTNOTES TO CHAPTER 1

1. I. Frank, "The Role of Trade in Development," The Global Partnership: International Agencies and Economic Development, eds. R. Gardner and M. Millikan (New York: Praeger, 1968). Some commentators ranked the significance of the first UNCTAD with ". . . the formation of the first trade union in nineteenth-century capitalist societies." G. K. Helleiner, ed. A World Divided (Cambridge, Ma.: Harvard University Press, 1976), p. 4. Whether this is true remains to be seen. However, it may be worth noting that the Wagner Act was passed eighty-nine years after the first labor union was formed in the U.S.

2. It should perhaps be said that there is nothing unusual about this; the nations attending an international meeting are frequently divided into groups.

3. The two resolutions were combined in a "Charter of Economic Rights and Duties of States," which was approved by the General Assembly in December 1974.

4. See UNCTAD, Trade and Development Board, Committee on Commodities, "An Integrated Programme for Commodities " TB/B/C.1/193 and "An Integrated Programme for Commodities: Measures for Individual Commodities," TD/B/C.1/194, (October, 1975).

5. The NIEO is essentially a party platform and, accordingly, must be read with an eye on political realities. Accepted language can cover a host of conflicts. Nevertheless, the ideas contained in the IP have a substantial measure of acceptance among the LDCs.

6. This list appears in the Resolution on Commodities adopted by the Plenary Session at UNCTAD IV. The Integrated Programme prepared by the UNCTAD Secretariat specified a somewhat different set of commodities.

7. Agreements that create an organization which includes both buyers and sellers but which is not intended to intervene in the market are often called "producer/consumer forums." A commodity cartel is an organization which is designed to intervene in the market but which does not include consumer representatives.

8. Buffer stocks are impossible for perishable commodities and can only be of limited effect for products that deteriorate with storage. The IP, however, takes a very optimistic view of the possibilities for buffer stocks.

9. For example, the following is included in a description of the objectives of commodity agreements: "One such [other] objective would be the avoidance of deterioration in the 'real' price of

a commodity, when the commodity roughly maintains its position in final consumer preferences or as a raw material in industrial usage. A second, and not inconsistent objective, would be the reversal of a downward trend in prices where uncoordinated production in many countries is causing chronically depressed prices because of national problems of adjustments to saturated international markets." UNCTAD, Trade and Development Board, "An Integrated Programme for Commodities," TD/B/C.1/194 (October 1975), p. 7.

10. It is not entirely clear how the target price would be set. The most controversial possibility is "indexation," which means that the prices of commodities in the program be tied to an appropriate index of the prices of manufactured goods in world trade.

11. For example, one possibility suggested in UNCTAD staff documents is that buyers contribute 50 percent and sellers contribute the remaining 50 percent. See UNCTAD, Trade and Development Board, "An Integrated Programme for Commodities," TD/B/C.1/196 (October 1975), p. 8.

12. Keynes, for example, suggested a system of centrally financed buffer stocks. See J. M. Keynes, "The Policy of Government

Storage of Foodstuffs and Raw Materials," Economic Journal 68 (1938):68-83.

13. The second sentence of Secretary of State Kissinger's speech to UNCTAD IV at Nairobi reads as follows: "Our goal is nothing less than to shape an enduring structure of international collaboration that offers peace and prosperity, equal opportunity and dignity, to all peoples." Kissinger, "UNCTAD IV: Expanding Cooperation for Global Economic Development," U.S. Department of State, Bureau of Public Affairs, May 6, 1976, p. 1.

14. The IP is not meant to entirely displace established forms of development assistance, but it is understood by both DCs and LDCs as an alternative to them. For example, a statement issued by the French government in 1972 contains the following:

> . . By making consumers in rich countries pay a higher price for these food stuffs and metals than would result from the free play of competition, France is fostering the most acceptable form of aid-payment for human effort rather than charity pure and simple.

Quoted by Z. Mikdashi, Foreign Policy 14 (Spring, 1974), p. 59.

15. Secretary of State Henry Kissiner, "Global Consensus and Economic Development," Department of State Bulletin, vol. 73 (September 22, 1975), pp. 425-441. The U.S. position was not

unanimously accepted by the other DCs, a point about which more is said below.

16. The European Economic Community recently instituted a compensatory financing scheme called STABEX. STABEX covers twelve commodities and forty-six countries. The International Monetary Fund has operated a compensatory financing scheme since 1963.

17. A commitment to help speed development would seem to imply that the market mechanism cannot be relied on to provide "sufficiently rapid" development. Viewed in this light, the U.S. position is awkward, as it is basically a matter of removing existing barriers to trade and capital flows -- i.e., removing flaws in the market.

18. "Thus, the unpredictability of export earnings can make a mockery of development planning," Kissinger, "Global Consensus," op. cit., p. 428.

19. The splits in the ranks of the developed nations reflect several considerations. First, the other DCs, especially the European nations, have traditionally taken a much more tolerant view toward cartels than has the U.S. Second, Canada and Australia are inclined to take the position of major exporters, which they are. Third, for a variety of reasons, major

concessions on tariffs are more difficult for European nations than for the U.S.

20. The U.S. entered a statement that -- in effect -- disagreed with some key features of this resolution, especially, the Common Fund.

21. The qualification is needed only because there are a few metals -- tungsten, cobalt, tin -- that are largely supplied by LDCs. However, there are substitues for these metals in most applications, substitutes for the "applications" in which the metals are required and enormous room for technological development to find ways around shortages. It is also worth noting, that the U.S. is the largest producer, or among the largest producers, of iron, copper, aluminum, lead and zinc -- to say nothing of molybdenum, vanadium, uranium, etc. There is no LDC that even begins to rival the U.S. in production of basic commodities. Secretary Kissinger discounted an economic threat from the LDCs: "The United States, better than almost any other nation, could survive a period of economic warfare," Kissinger, "UNCTAD IV," op. cit., p. 2.

22. The short story is that buyers lose twice -- by the higher price and by the reduction in quantity consumed. Price increases also set up secondary distortions which further reduce the value of goods and services available to buyers.

CHAPTER 2

ASPECTS OF PRICE INSTABILITY

The underlying purpose of a system of commodity agreements along the lines of the IP would be to speed the economic growth of the LDCs. While this objective might seem to obviously imply higher commodity prices, discussions of commodity agreements are often not frankly based on that assumption. It is instead argued that instability in commodity prices is a major obstacle to development and, hence, that arrangements that stabilized commodity prices would promote development. "Stable prices" is often understood as a euphemism for "higher prices," but the proposition that the extreme fluctuation of commodity prices is a significant obstacle to development is taken seriously. Or, at least taken seriously enough to confuse discussions of commodity agreements.

Given that instability in commodity prices is a major problem for the LDCs, acceptance of arrangements that simply reduced period-to-period price fluctuations would seem to be an appropriate way for the DCs to redeem their commitment to aid the LDCs' development. Such measures, including buffer stocks, would be relatively innocuous.[1] Furthermore, it is often suggested that price stabilization would benefit buyers (in some unspecified way) as well as sellers. Agreements designed to significantly increase commodity prices would not, however, be innocuous. They would

not be in the direct economic interests of the DCs and, as is argued in later chapters, would be a fertile source of conflicts.

This chapter reviews the various effects that are commonly attributed to the instability of commodity prices, especially effects on development. The discussion attempts to clarify the possible roles of commodity agreements and, in the course of doing so, to identify the crucial economic issues.

INSTABILITY IN COMMODITY PRICES AND THE LDCs' EXPORT EARNINGS

It is commonly assumed that the LDCs' obtain most of their export earnings by selling commodities to the DCs; that commodity prices are subject to large fluctuations; and that, consequently, the LDCs' export earnings are extremely unstable. While the facts are somewhat more complicated, these views are substantially correct.

Table 2-1 presents some summary data on the instability of export earnings of DCs and LDCs. The "index of instability" used is a measure of departures from trend. Assuming that the deviations from trend have a normal (i.e., bell shaped) distribution, a value of (say) 10 for the index of instability means that export earnings will be within $\pm$10 percent of trend approximately two-thirds of the time.[2] The mean value of the index of instability for LDCs was about 30 percent above that for the DCs during the period 1946-1958. The index of instability fell for both DCs and LDCs in the period 1954-1966, but the index for LDCs was still more than twice that for the DCs.

Table 2-1

Comparison of the Instability of Exports of Merchandise Plus Services of Selected DCs and LDCs

Index of Instability Characteristics[1]	1946-1958 DCs	1946-1958 LDCs	1954-1966 DCs	1954-1966 LDCs
mean	17.6	23.0	6.2	13.4
median	18.1	18.3	6.3	12.8
median of upper half	23.3	32.0	7.8	17.8
median of upper quartile	26.4	41.3	8.9	21.5
standard duration	7.1	12.8	2.2	6.2
coefficient of variation (percent)	40.3	55.7	35.5	46.3

1/ See text for an explanation of this index.

Source: G. Erb and S. Schiavo-Campo, "Economic Instability, Level of Development and Economic Size of Less Developed Countries," Bulletin of the Oxford University Institute of Economics and Statistics, Vol. 31 (1969), p. 267.

A major cause of instability in LDC export earnings is instability in the commodity markets.[3] The commodities industries are to a greater extent than manufacturing or services subject to inherent uncertainties. Weather is the principal source of uncertainty for agricultural commodities. The supply of metals is reasonably stable but there are wide swings in demand. Furthermore, short-run supply and demand for most commodities are price inelastic. Consequently, small variations in either supply or demand give rise to large changes in price.

Table 2-2 indicates actual variations in the prices of 17 commodities.[4] For the sake of comparision, similar data are given for the U.S. prices of several manufactured goods. Comparison of the "highs" and "lows" clearly suggests that commodity prices are much less stable than the prices of manufactured goods. This impression is confirmed by the coefficients of variation.[5] For the period 1950-1975 the coefficients of variation for the commodity prices (except for bananas, wheat and rice), were at least twice those of the manufactured goods.[6]

The effect of changes in a commodity's price depends in part on the extent to which the LDCs' exports are diversified. The LDCs are often viewed as "one crop" or "few crop" economies; i.e., nations which drive the bulk of their incomes from export of only a few commodities. The data presented in Table 2-3 indicate that most LDCs do fit this pattern. (More detailed data appear in Appendix 2-1). Only one of these nations (British West Indies)

TABLE 2-2

Variation in Commodity Prices,[1] 1951-1975

	High (1975 = 100)	Low (1975 = 100)	Coefficient of Variation[2]
bananas	214.1	100.0	.18
cocoa	190.7	54.9	.29
coffee	288.2	100.0	.25
tea	274.2	100.0	.26
wheat	125.6	72.9	.14
rice	153.5	69.2	.21
cotton	227.1	100.0	.22
jute[3]	166.7	77.4	.21
sisal[4]	144.5	41.4	.38
wool	324.7	100.0	.29
beef[5]	129.4	26.8	.55
sugar	28.7	16.9	.61
rubber	531.6	100.0	.38
copper	285.3	100.0	.33
tin	129.0	67.9	.20
iron[3]	157.1	61.0	.25
Electrical machinery and equipment	127.0	100.0	.06
mechanical power and transmission equipment	103.0	74.3	.10
new cars	153.2	100.0	.13[6]
women's and girl's apparel	140.8	100.0	.08

TABLE 2-2 (cont'd)

1/ Commodity prices were deflated by the U.N. world price index for all commodities. The prices of electrical machinery and equipment and mechanical power and transmission equipment were deflated by the U.S. wholesale price index of durable manufactures. The prices of new cars and women's and girl's apparel were deflated by the U.S. consumer price index.

2/ The coefficient of variation is the ratio of the standard deviation of the series to its average value.

3/ Series begins with 1954.

4/ Series begins with 1955.

5/ 1951-1975.

6/ 1953-1975.

Sources: International Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975 edition; United Nations, Food and Agriculture Organization, Trade Yearbook; United Nations, Monthly Bulletin of Statistics; U.S. Department of Labor, Bureau of Labor Statistics, Consumer Prices and Price Indices; Bureau of Labor Statistics, Wholesale Prices and Price Indexes.

TABLE 2-3

Percent of LDCs' Export Earnings
Derived from Commodities, Except Petroleum

Percent of Export Earnings From:	Largest Commodity Export		Largest Three Commodity Exports		All Commodity Exports	
	Number	Cumulative	Number	Cumulative	Number	Cumulati
90-100	1	1	6	6	12	12
80-90	4	5	5	11	12	24
70-80	4	9	6	17	15	39
60-70	6	15	11	28	13	52
50-60	12	27	15	43	12	64
40-50	7	34	10	53	9	73
30-40	12	46	11	64	9	82
20-30	18	64	11	75	9	91
10-20	15	79	7	82	5	96
0-10	35	114	32	114	18	114

Source: Compiled from data in International Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975 edition.

is literally a one crop economy. However, more than half of the LDCs derive at least 50 percent of their export earnings from three or fewer commodities and only 18 of the 114 LDCs obtain less than 10 percent of their export earnings from three commodities.

The significance of instability in export earnings depends on the size of the export sector relative to the economy as a whole. Table 2-4 provides some data which bears on this point. For 25 of these nations, export earnings were at least 40 percent of Gross Domestic Product (GDP) in 1972. Most of the nations in this group have classic "few crop" economies. That is, not only are their export earnings derived from only a few commodities but also the export sector is the bulk of the economy. This is not, however, typical of LDCs as a group. Export earnings were less than 40 percent of GDP for 87 of the LDCs and less than 20 percent for 60 of the LDCs.

The conclusions that have been offered here are not controversial. There is some dispute over whether the export earnings of the LDCs are markedly less stable than those of the DCs. But this is not a crucial point,[7] and the instability of commodity prices is well established. The important disagreements are over the significance of the fact of instability in commodity prices and export earnings.

TWO POPULAR ARGUMENTS

Popular discussions usually do not explain why price instability is a problem; it is taken for granted that the

TABLE 2-4

Distribution of LDCs' Export Earnings as a Percent of GDP 1972[1/]

Export Earnings as a Percent of GDP	Number of LDCs	Cumulative
100 -	3	3
80 - 100	4	7
60 - 80	10	17
40 - 60	8	25
20 - 40	27	52
10 - 20	35	87
0 - 10	25	112

1/ In several cases, it was necessary to use the average value of exports for 1971-1972.

Sources: International Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975 edition; Europa Publishing Company, Europa Yearbook; and International Monetary Fund, International Financial Statistics.

instability of commodity prices is a burden on the LDCs. When the undesirable effects of price instability are explained at all, it is with a passing reference to the "boom-bust" cycle or, less frequently, to the "excessive" risk of the commodity markets.[8] Neither of these considerations is taken seriously in the professional literature, but they are worth discussion because they are so frequently heard.

The scenario assumed in the boom-bustcycle argument is as follows. In periods when demand is high and prices are rising, existing producers expand their production and entrants are attracted. The increased supply and/or a decline in demand subsequently drive price down to a very low level. What seemed to be a good investment can, then, prove to be unprofitable. Supply is cut back, marginal producers leave the market and the cycle begins again.

The effect of a buffer stock on the boom-bust cycle seems straightforward at first glance. The buffer stock would buy in periods of "excess" supply, thereby maintaining price and producers' revenues. The stocks acquired would be sold off in periods of tight supply. The result would be stable prices and revenues, or, in short, a cure for the boom-bust cycle.

This view is correct as far as it goes, but it does not go very far. The missing element is a clear appreciation of the costs of the boom-bust cycle, which are those of the "excess" investment. That is, unprofitable investments are made and these represent resources that are, for at least a time, wasted. In the view sketched above, these costs are simply transferred to the buffer

stock organization. There is no net gain, and very possibly no gain even to suppliers.[9]

Price stabilization, then, is not equivalent to a cure for the boom-bust cycle. If a buffer stock is to have a substantial effect on the boom-bust cycle it must, by stabilizing prices, reduce or prevent "excess" investment. It may seem reasonable to suppose that stable prices would promote a stable pattern of investment, but this is not obvious. To establish the point, something must be said about the causal relationship connecting price instability and investment decisions.

A relatively simple possibility lies in what can be called the "myopia theory" of the boom-bust cycle. The myopia theory asserts that competitive firms place undue weight on near-term conditions. In particular, during boom periods competitive firms falsely believe that high prices will persist. There is, consequently, overinvestment, which drives prices down and so forces some suppliers from the market. A buffer stock would cure the myopia by holding price closer to its long-run equilibrium level, announcing a target price related to the long-run equilibrium price and otherwise providing a sound basis for forecasting.

The myopia theory is not however the only "reasonable" explanation of boom-bust cycles. Another possibility follows from a critique of the limitations of prices as a signaling device. Suppose: (1) that there are initially 100 equal sized producers of the commodity; (2) that there is a small permanent increase in demand; and (3) at the higher level of demand there is room for one

new producer or one producer twice the size of the others. The increase in demand will cause a short-run increase in price. The increase in price provides all of the existing producers with an incentive to expand. But if all producers expand, the increase in supply will be 100 times greater than that required to meet the increase in demand.

This example makes the point that price gives suppliers only "yes/no" information on investment. Price does not indicate how many new suppliers should enter and how much capacity should be added by existing firms. Consequently, if each producer and potential entrant responds in the expected way, the result can be "overinvestment." Markets solve this problem by trial and error; i.e., by squeezing out, via price decreases, excess capacity. Given the process just sketched, even a large well managed buffer stock would not cure the problem at all. Price, if it is to play its role as a signaling device, must be allowed to rise by enough to attract additional supply as that becomes necessary. A rush to invest, as described in the example, would then occur. A buffer stock could, in fact, exacerbate the problem if producers had reason to believe that excess production would be absorbed by the buffer stock.

The key element in this discussion is the relationship between price instability and the timing of investments. This relationship is not well understood but, given the present state of knowledge, it cannot be said that the boom-bust cycle provides a clear rationale for buffer stocks.

A second popular, but less frequently asserted proposition, is that the commodity markets are "excessively" risky. While the commodity markets are more risky than most manufacturing industries[10] it is far from obvious just what it means to say that the commodity markets are "excessively" risky.

One possibility identifies risk with incomplete information. The price that prevails on a market at any time does not depend only on the current levels of supply and demand but also on buyers' and sellers' expectations about the future. To the extent that the information behind these expectations is incorrect or incomplete, current prices will give misleading signals and wasteful decisions may result. But the fact that "mistakes" are apparent in retrospect is not in itself an indictment of a market's ability to deal with uncertainty. It is not because information is costly to acquire; the situation is clearly not improved if the cost of acquiring the information required to avoid mistakes exceeds the cost of the mistakes.

Real world markets probably pass this test. Any buyer or seller who has better information than the market can act on that information to make a profit. Consequently, it is reasonable to presume that buyers and sellers use all available information and push their search for information[11] to the point where the cost of collecting additional information just equals the value of that information. If this condition is satisfied, a market can not be judged "excessively" risky in the sense that information is "excessively" incomplete.

The presumption that the market process efficiently acquires and incorporates information is strong but not absolute. For a variety of reasons, including laws, differences in language and trade customs, a governmental organization may be able to collect information more cheaply than private firms. To the extent that is so, the commodity markets are non-optimally risky.

A case for buffer stocks would not, however, follow immediately if this premise were accepted. The underlying problem is, by assumption, a lack of information. This problem could be attacked directly by creating an improved system of communication (news services, trade associations, price reporting, statistical publications). A buffer stock would be warranted only if it were cheaper to have a central authority act on the information than to disseminate it to participants in the market.

The preceding argument is, at best, shaky. It is far from clear that the information available on the commodity markets is "excessively" incomplete -- i.e., that the benefits of additional information would exceed its costs. Even if this is so, it is implausible to suppose that a buffer stock is the least costly way to solve the problem.

A much more straightforward argument can be produced by identifying risk with price fluctuations. The costs of risk are then the costs associated with period-to-period variations in prices. First, as the degree of price instability increases, both buyers and sellers may be led to employ more working capital, and hold larger inventories. Second, price instability can increase costs

by requiring changes in production rates, creating problems of scheduling the work force, complicating purchasing decisions, etc. Third, instability in prices typically implies instability in suppliers' returns and as returns become more variable the cost of capital to suppliers increases.

A buffer stock could, by stabilizing prices, lead to a reduction in these costs. The buffer stock would be warranted if its costs were less than the cost savings to buyers and sellers. However, it seems unlikely that this condition is in fact satisfied. At least much of any reduction in buyers' and sellers' inventories would be matched by an increase in inventories held by the buffer stock.[12] Furthermore, in most of the commodities industries, working capital requirements are relatively low and the agricultural industries are typically not capital intensive. These considerations suggest that cost savings would be minor. The costs of buffer stocks are not typically minor; as is discussed in Chapter 4, buffer stocks are often expensive propositions.[13] While these comments are far from conclusive, they suggest that it is unlikely that buffer stocks could be justified as a device for reducing costs.

The conclusion of this discussion is that popular conceptions of the effects of price instability do not provide a solid rationale for buffer stocks. It may be that the boom-bust cycle is a serious problem or that commodity markets are excessively risky, but even a reasonable presumption in favor of either of these propositions has yet to be established.

COMMODITY PRICES AND DEVELOPMENT

International discussions of commodities are framed in terms of the relationships between trade and development. In part this simply reflects the LDCs' concern with economic development. But general acceptance of this focus reflects the consensus that international cooperation on development is required. Within these terms, the facts sketched in Chapter 1 raise the question of the extent to which instability of commodity prices and export earnings are an obstacle to economic development. This issue has played a prominent role in international discussions of commodities. It is generally agreed that to the extent that instability is an obstacle to development, international cooperation to stabilize the LDCs' export earnings is warranted. This would not justify measures designed to increase commodity prices. It might, however, justify pure buffer stocks or compensatory financing. Compensatory financing is probably the better of the two, but attention has been focused on buffer stocks.[14]

There are several ways in which instability in export earnings can adversely effect development.[15] The argument made most frequently turns on the role of the LDCs' governments in the development process. Most of the LDCs have a tremendous need for infrastructure investment -- roads, hospitals, schools -- and, as in the DCs, the responsibility for infrastructure investment rests with the government. Furthermore, in many of the LDCs the government assumes a substantial direct responsibility for agricultural and industrial investment.

Development programs generate a demand for foreign manufactures -- fertilizers, cement, steel, machinery, etc. Imports of these items must be paid for with foreign currencies, which the LDCs largely acquire by export of commodities. Governments can tap the flow of foreign exchange earnings in a variety of ways. One common procedure is to require producers to sell to the government at a fixed price, which is set well below the market price. Payment is made in the national currency. The government then sells the commodity in international markets and is paid in foreign currencies.

Whatever particular method is used, the foreign exchange available to the LDCs' governments depends on commodity prices. When commodity prices are high, the government's command over foreign exchange is correspondingly high.[16] A sharp drop in commodity prices typically results in a decline in export earnings and government revenues. To the extent that they depend on imports, government financial development programs must be cut back. Furthermore, if imports are maintained at existing levels, a reduction in the value of exports produces a balance of payments deficit. This puts pressure on the country's exchange rate and creates a need for borrowing.

The "ups and downs" of the commodity markets do not necessarily balance out from the point of view of development. They do not because a reduction in funds available can require costly delays in projects, add uncertainty to the timing of related projects, etc. The general proposition is that instability in

commodity prices, and export earnings adversely affects investment planning.

This argument is plausible and its factual basis is substantially correct. Nevertheless, the available evidence does not support the proposition that instability is a major obstacle to development. This conclusion emerges from a statistical study of a sample of LDCs.[17] MacBean found a negative correlation between growth in GDP and instability in export earnings. However, the correlations did not differ significantly from zero, which is to say that this test indicates the absence any marked effect of instability in export earnings on GDP. Furthermore, on each of several tests, the relationship between investment and instability proved to be statistically insignificant but positive; i.e., higher levels of investment proved to be associated with less stable export earnings. As investment is the means by which development occurs, this finding runs strongly against the proposition that instability in export earnings is a major obstacle to development.

These results are confirmed in a recent study by Knudsen and Parnes.[18] Knudsen and Parnes, again, found a positive association between investment and instability of export earnings. They also found a positive association between the rate of growth of GNP and GNP per capita and instability in export earnings.

The statistical results obtained by McBean and Knudsen and Parnes do not deny the logic of the argument that instability in export earnings disrupts planning,[19] or the logic of the other

reasonable arguments that show how instability in export earnings can be an obstacle to development. It is the importance of these arguments that is challenged. The empirical results at a minimum indicate that the connections between instability in export earnings and development are generally weak.[20] The evidence does not rule out the possibility that instability in export earnings is a serious obstacle to development in some cases. For small nations which depend on only two or three commodities, instability in export earnings may be a crucial problem. However, it does not seem possible to make a general case that price stability adversely affects economic development.

The crucial connection between trade in commodities and economic development does not lie in price or earnings instability, but in the position of the LDCs in the commodity markets. The LDCs seek to exploit the fact that, in most cases, the bulk of the commodity is supplied by a relatively small number of nations. Given this fact, monopolistic pricing is conceivable. The model is OPEC, which has had a tremendous effect on the development of the major oil producers among the LDCs. But this effect was not achieved by reducing fluctuations in oil prices but by quadrupling them. The same is true of other commodities. A system of commodity agreements along the lines of the IP would have a significant effect on development to the extent that it increased the LDCs earnings from commodity exports. If the primary objective of commodity agreements is to speed economic development, "stabilization" in the sense of reduced price fluctuations must not be confused with

"stabilization" in the sense of higher commodity prices. It is the latter of these that is of major significance for economic development.

DIRECT EFFECTS OF PRICE STABILIZATION ON BUYERS AND SELLERS

The discussion might end at this point but for the contention that price stabilization can be, apart from any effects on development, of benefit to both buyers and sellers. This is the most complex and confusing aspect of the discussion of commodity problems. It is widely believed that "excessive" instability in commodity prices is undesirable. This belief seems to be based only on intuition; apart from possible effects of development, it is not explained in concrete terms why price stability is undesirable. Given that buffer stocks are costly, this issue cannot be avoided. Is price instability simply a nuisance or is it a serious matter?

Surprisingly enough, there is a clear and direct way in which price stabilization may benefit sellers, buyers or both. The argument is made by taking a close look at the effects of price changes on suppliers' revenues and the value that buyers place on their purchases.[21]

Table 2-5 presents a hypothetical example which focuses on suppliers' revenues. It is assumed that the level of demand is constant and that supply varies from "low" to "average" to "high" as weather is "bad," "normal" or "good."[22] When supply is "low," price and revenue are relatively high; conversely, when supply is "high," price and revenue are relatively low. The second set of

Table 2-5

Example of the Effects of Price Stabilization on Suppliers' Revenue When Demand is Constant and Supply Varies

(a) Without price stabilization

Weather	Production	Supply	Price	Revenue
Bad	80	80	1.5	120
Normal	100	100	1.0	100
Good	120	120	0.5	60

(b) With price stabilization

Weather	Production	Buffer Stock Sales (+) and Purchases (-)	Supply	Price	Revenue
Bad	80	+20	100	1.0	100
Normal	100	0	100	1.0	100
Good	120	-20	100	1.0	100

figures in Table 2-5 shows the effects of evening out variations in price and supply. The remarkable fact that appears is that suppliers' revenue is increased by stabilizing price. This is not an accidental result that depends on the particular numerical values used; it is, instead, a general property of cases in which demand is constant and supply varies. The result also does not require any "tricks." As a matter of arithmetic, it appears because as supply is increased and price falls, revenue falls at an increasing rate. The underlying proposition is that when price is already low, relatively large decreases in price are necessary to persuade the market to accept an increase in supply. Given this commonsense proposition, the arithmetic shows that (if supply varies while demand is constant) price stabilization increases suppliers' revenues.[23] Buyers in this case clearly lose by price stabilization since, on average, they pay more for the same quantity.

The example in Table 2-5 is intended only to point to the fact that price stabilization has predictable effects on suppliers' revenues and profits and on buyers' gains from their purchases. This line of argument is pursued in Chapter 4. It is shown there, that: (1) if supply varies while demand is constant, suppliers gain from price stabilization while buyers lose, but the suppliers' gain exceeds the buyers' loss;[24] (2) if demand is constant while supply varies, buyers gain from price stabilization, while sellers lose, but the buyers' gain exceeds the sellers loss; (3) if both supply and demand vary, there is a net gain to price stabilization, but, depending on the relative variability of supply and demand,

suppliers may gain and buyers lose; or buyers may gain while suppliers lose; or both buyers and sellers may gain.

These propositions speak only to the benefits of price stabilization. To move from this point to a case for pure buffer stocks requires a comparison of benefits and costs. But it is necessary to ask first whether existing market institutions -- especially futures markets -- obviate the question.

Futures markets provide both buyers and sellers a way of avoiding uncertainty. For example, suppose a crop is planted in April and harvested in August. In April, a producer can sell a specified quantity forward at a guaranteed price.[25] Similarly, a user can buy "now" at a guaranteed price for future deliver. The futures markets, however, are also used for purely financial transactions -- i.e., speculation.

The question typically raised at this point is whether futures markets tend to stabilize prices or, instead, lead to even greater price instability. Economists have usually argued that speculation is stabilizing.[26] If so, the existence of a futures market in a commodity reduces the need for a buffer stock. Others argue that amateur speculators -- who are eventually driven from the market by losses -- are frequently a destabilizing influence. In this event, the existence of a futures market strengthens the case for a buffer stock.

There is a more subtle point that puts this issue in a different perspective. A supplier or buyer can "buy insurance" on a futures market by selling or buying forward. The entire crop

would not be sold forward, as if production is less than expected the seller would have to buy back his own contracts. Furthermore, if the price in the future turns out to be unexpectedly high, the producer would prefer not to have sold forward. A buffer stock avoids these difficulties and so may be a superior form of insurance.[27]

The conclusion of these comments is that a buffer stock which stabilized prices would provide benefits to suppliers, buyers, or both.[28] This is a strictly limited conclusion. It leaves open issues concerned with the practicalities of buffer stock management and the question of whether the benefits of buffer stocks would exceed their costs.

CONCLUDING COMMENTS

This chapter has presented two major conclusions. First, and most important, instability in export earnings is not a major obstacle to development. Given this fact, it is not sensible to at once maintain that the objective of commodity agreements is to speed economic development and that commodity agreements would be limited to reducing period-to-period variations in commodity prices. Second, reducing period-to-period variations in prices might be of direct benefit to sellers or buyers or both.

The net result of the discussion is a sharp distinction between two alternative objectives of commodity agreements. One potential objective is economic development; commodity agreements would then serve to transfer income to the LDCs via higher commodity prices. The alternative "basic objective" is simply to reduce

period-to-period variations in commodity prices without increasing their average level.

Much hangs on this distinction. The type of agreement that is appropriate, the problems that agreements would face, the terms on which they would be judged and the direction in which agreements would evolve all depend on the objective that is to be served. Pure buffer stocks are the type of arrangement to be considered if the objective is to reduce period-to-period variations in prices. Given this relatively modest objective the questions are, first, whether buffer stocks could be limited to the task of reducing price fluctuations and, second, whether the benefits of buffer stocks would exceed their costs. If the objective is to speed economic development, commodity agreements must be designed to increase commodity prices. This would require agreements with provisions that go beyond those of a pure buffer stock arrangement -- production controls, export quotas, limitations on entry, etc. Such agreements would be judged in terms of their effect on the LDCs' development and whether they would speed development would depend on their ability to contain the forces of competition among suppliers.

Commodity Share of Country Exports, Except Petroleum
Average 1970-1972

Country	Largest Commodity Export	Share of Total Exports	Share of Top Three Commodities	Share of All Commodities**	Exports as a % of GDP
Argentina	beef	17.4	26.4	51.3	6
Bahamas*	sugar	.5	.5	3.1	90
Barbados	sugar	35.6	35.8	35.8	24
Belize	sugar	29.9	29.9	34.0	30
Bermuda	--	0.0	0.0	6.4	31
Bolivia	tin	50.1	55.0	74.4	20
British West Indies	bananas	63.8	90.9	100.0	NA
Brazil	coffee	28.0	42.2	62.7	8
Chile	copper	71.6	78.2	81.4	11
Colombia	coffee	59.5	66.6	73.9	9
Costa Rica	bananas	29.3	62.8	73.0	24
Cuba	sugar	71.8	72.0	73.7	23
Dominican Rep.	sugar	48.9	65.0	80.6	18
Ecuador	bananas	39.6	65.6	72.9	11
El Salvador	coffee	42.1	58.8	60.6	24
Guadeloupe	sugar	52.7	85.7	85.7	13
Guatemala	coffee	33.0	48.2	57.5	14
Guyana	sugar	30.7	65.6	67.4	47
Haiti	coffee	44.1	66.1	72.5	8
Honduras	bananas	45.11	66.7	85.9	24
Jamaica	bauxite	25.4	40.5	41.2	24
Martinique	bananas	54.2	59.4	59.4	13
Mexico	cotton	8.3	20.0	34.4	5
Netherlands* Antilles	bauxite	.1	.1	.1	206

Commodity Share of Country Exports, Except Petroleum
Average 1970-1972

Country	Largest Commodity Export	Share of Total Exports	Share of Top Three Commodities	Share of All Commodities**	Exports as a % of GDP
Nicaragua	cotton	23.3	54.8	65.8	24
Panama	bananas	53.9	60.8	64.8	9
Paraguay	beef	12.9	19.2	47.3	12
Peru	copper	21.7	35.8	89.0	13
Surinam	bauxite	30.4	35.4	36.6	50
Trinidad Tobago*	sugar	4.7	5.8	6.0	52
Uruguay	beef	34.7	55.7	68.8	9
Venezuela*	iron ore	4.5	5.3	5.7	27
Algeria*	iron ore	1.2	1.2	2.3	21
Angola	coffee	30.8	42.4	53.6	21
Botswana	beef	11.6	11.7	12.7	30
Burundi	coffee	84.4	93.1	99.0	10
Cameroon	coffee	26.5	54.4	70.2	18
Cent. African Rep.	cotton	27.6	52.1	63.4	13
Chad	cotton	62.4	74.5	76.8	10
Congo Pr.	sugar	8.9	16.8	75.2	12
Dahomey	cocoa	23.0	47.7	61.2	12
Egypt	cotton	46.9	55.8	56.8	10
Eq. Guinea	cocoa	56.9	78.1	100.0	43
Ethiopia	coffee	53.8	56.6	67.7	6
Gabon	cocoa	.9	1.0	45.0	76
Gambia	--	0.0	0.0	88.6	33
Ghana	cocoa	61.1	61.8	73.7	16

Commodity Share of Country Exports, Except Petroleum
Average 1970-1972

Country	Largest Commodity Export	Share of Total Exports	Share of Top Three Commodities	Share of All Commodities**	Exports as a % of GDP
Guinea	coffee	11.6	16.6	24.2	12
Guinea Bissau	--	0.0	0.0	31.1	5
Ivory Coast	coffee	30.7	52.4	79.8	30
Kenyo	coffee	26.5	45.6	55.4	18
Lesotho	wool	20.6	37.8	37.8	8
Liberia	iron ore	72.7	90.3	96.2	60
Libyan Arab Rep.*	wool	<.1	<.1	.1	60
Malagasy Rep.	coffee	27.2	36.8	46.8	15
Malawi	tea	20.0	22.2	81.7	17
Mali	cotton	33.0	35.9	55.5	8
Mauritania	iron ore	77.3	84.1	85.2	48
Mauritius	sugar	88.7	92.9	93.9	43
Morocco	cotton	1.1	1.9	30.3	12
Mozambique	cotton	14.8	34.1	53.8	7
Namibia	copper	62.9	62.9	99.9	NA
Niger	cotton	2.7	3.5	55.6	10
Nigeria*	cocoa	10.4	13.5	19.6	23
Reunion	sugar	83.8	83.8	83.8	10
Rhodesia	cotton	4.4	7.2	23.4	22
Rwanda	coffee	52.1	80.7	81.0	9
Senegal	cotton	1.0	1.1	46.0	20
Sierra Leone	iron ore	12.0	22.0	28.4	22
Somalia	bananas	27.8	27.8	34.4	18
Sudan	cotton	60.6	60.8	69.2	17
Swaziland	iron ore	20.5	20.5	25.0	65
Tanzania	coffee	16.0	38.3	48.2	20

Commodity Share of Country Exports, Except Petroleum
Average 1970-1972

Country	Largest Commodity Export	Share of Total Exports	Share of Top Three Commodities	Share of All Commodities**	Exports as a % of GDP
Tago	cocoa	36.0	57.2	91.7	16
Tunisia	iron	1.0	1.4	12.3	15
Uganda	coffee	58.8	86.9	96.0	18
Upper Volta	cotton	21.7	25.6	37.4	5
Zaire	copper	64.2	73.8	84.9	36
Zambia	copper	94.1	94.2	97.5	39
Afghanistan	cotton	13.9	22.6	23.6	92
Bangladesh	jute	48.9	59.8	60.0	8
Brunei*	beef	<.1	<.1	.1	190
Burma	rice	44.6	48.2	76.1	5
China	sugar	3.0	3.8	7.1	59
Cyprus	copper	14.5	14.9	16.0	23
India	tea	9.3	18.2	26.5	8
Indonesia	rubber	17.5	27.9	51.1	29
Iran*	cotton	2.0	2.4	2.8	45
Iraq*	wool	.3	.4	.5	61
Israel	cotton	1.1	1.2	2.2	18
Jordan	bananas	.8	1.0	21.2	8
Khmer Rep.	rice	35.0	47.9	56.0	<1
Korea Rep.	iron ore	.3	.5	1.7	32
Kuwait*	coffee	.1	.3	.4	86
Laos	cotton	1.9	3.1	29.4	<1
Lebanon	wool	1.7	2.2	6.4	17
Malaysia	rubber	28.2	47.0	72.3	35
Nepal	rice	89.0	93.5	100.0	6

Commodity Share of Country Exports, Except Petroleum
Average 1970-1972

Country	Largest Commodity Export	Share of Total Exports	Share of Top Three Commodities	Share of All Commodities**	Exports as a % of GDP
Pakistan	cotton	15.2	23.0	27.4	8
Phillippines	sugar	18.0	35.7	76.6	13
Saudi Arabia*	--	0.0	0.0	0.0	132
Singapore	--	0.0	0.0	0.0	78
Sri Lanka	tea	57.9	75.4	84.1	23
Syrian Arab Rep.	cotton	38.3	43.8	48.4	12
Thailand	rice	18.1	38.0	60.9	13
Vietnam	rubber	52.1	57.1	57.1	5
Yemen Arab Rep.*	coffee	18.3	36.0	44.2	1
Yemen Dr.*	cotton	3.4	4.9	6.8	78
Br. Solomon Is.	cocoa	.9	1.3	100.0	13
Fiji	sugar	55.4	55.8	62.9	29
Fr. Polonesia	--	0.0	0.0	15.3	6
Gilbert/Ellice Is.	--	0.0	0.0	100.0	90
New Hebrides	beef	2.0	4.25	42.8	31
Paupa New Guinea	copper	26.5	52.7	75.3	77

Source: International Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975 Edition.

* Greater than 50 percent share of exports in petroleum.

** Includes 34 commodities in all, the 18 commodities in question and the following in addition: abaca, coconut oil, copra, fishmeal, ground nut oil, ground nuts, hides/skins, lead, linseed oil, maize, manganese ore, palm oil, phosphate rock, silver, tabacco, and zinc.

FOOTNOTES TO CHAPTER 2

1. The question of whether buffer stocks could be limited to the the task of reducing period-to-period variations in price is postponed to ch. 3.

2. For a definition of this index, see G. Erb and S. Scheavo-Campo, "Economic Instability, Level of Development and Economic Size of Less Developed Countries," Bulletin of the Oxford University Institute of Economics and Statistics 31 (1969): 266. The verbal interpretation of the index given is only loosely correct, and should be used only to gain an impression of what the numbers in Table 2-1 mean.

3. For discussions of the causes of instability in export earnings, see A. MacBean, Export Instability and Economic Development (Harvard University Press, 1966), ch. 2, and M. Michaely, Concentration in International Trade (North Holland Publishing Co., 1962).

4. These were the commodities specified in the Integrated Program prepared by the UNCTAD Secretariat. See "An Integrated Programme for Commodities," United Nations Conference on Trade Development, Trade and Development Board, TD/B/C. 1/194 (October, 1975), p. 13.

5. The coefficient of variation is the ratio of the standard deviation of a series to its average. If the values in the series are independently and normally distributed, a value of, for example, 0.1 for the coefficient of variation means that values will be within $\pm$10 percent of the mean value about two-thirds of the time.

6. The coefficients of variation are somewhat lower if the years 1973-1975 are omitted. Nevertheless, the coefficients of variation remain much higher for commodities than for manufactured goods.

7. It is not because any given degree of instability in export earnings may have very different consequences for an underdeveloped nation than for an industrialized nation.

8. It is important to distinguish buffer stocks, and other arrangements designed to stabilize prices, from contingency stocks. A contingency stock is held against specific possibilities -- war, famine, etc. The benefit of a contingency stock is its insurance value. As a buffer stock would periodically be at zero level, it would not provide reliable insurance. Contingency stocks have been proposed for foods, especially major grains. While these proposals are potentially significant, they have not played a central role in international discussions of commodity problems. See R. Weckstein, "Do We

Need a World Food Reserve? A Counter Proposal," unpublished paper, no date.

9. Suppliers would contribute all, or at least much, of the costs of the buffer stock. That is, suppliers must pay out to the buffer stock when it is buying. Suppliers, then, would simply get back in larger revenues what they pay out to the buffer stock. This would not occur once the buffer stock has accumulated a sufficiently large pool of funds. These funds, however, would still carry an implicit interest cost equal to the return that could be obtained in the best alternative employment of them.

10. Although perhaps less risky than many financial markets and some types of construction.

11. And create a demand for firms that specialize in providing information.

12. See Charles River Associates, Public and Private Stockpiling; report prepared for the National Commission on Supplies and Shortages, August 1976, for an analytical treatment of this issue. It is also worth noting that a buffer stock would at least to some extent assume private inventory costs, which is probably one reason why stabilization measures are favored.

13. It is also worth noting that existing futures markets provide a way for buyers and sellers to escape some forms of uncertainty. For example, a supplier can obtain a known, certain return in the future by selling forward. A buyer can, similarly eliminate uncertainty over price and availability by buying a futures contract.

14. Because of perishability, high storage costs and heterogenous grades, buffer stocks are feasible for only a few commodities. Compensatory financing can have a much broader coverage and strikes directly at the problem. Furthermore, compensatory financing avoids the storage and interest costs associated with buffer stocks.

15. For a summary of these arguments, see A. MacBean, op. cit., ch. 1.

16. This statement assumes that the demand for commodities is price inelastic which, with only a few exceptions, is the case.

17. MacBean, op. cit., ch. 4. MacBean also buttressed his statistical work with several case studies.

18. O. Knudsen and A. Parnes, Trade Instability and Economic Development (Lexington Books, 1975), especially ch. 9.

19. However, Knudsen and Parnes argue that instability in exports earnings tends to reduce the propensity to consume and, therefore, promotes saving, which tends to speed development.

20. Several reasons why this is so can be found. For example, much of the funding for development programs comes from external sources rather than export earnings. A second reason appeared in Table 2-4, in particular, in over half of the LDCs, export earnings are 20 percent or less of gross domestic product.

21. The argument developed here follows B. Maissell, "Price Stabilization and Welfare," Quarterly Journal of Economics 83 (1969): 285-298, which provides references to the earlier literature. See also S. Turnovsky, "The Distribution of the Welfare Gains from Price Stabilization: The Case of Multiplicative Disturbances," International Economic Review 17 (1976): 133-148.

22. Supply is assumed to be perfectly inelastic and the elasticity of demand is assumed to be -0.4. These assumptions do not affect the point of the example.

23. It is worth noting that, in terms of this example, compensatory financing would not be a substitute for buffer stocks. Compensatory financing simply serves to stabilize export earnings by direct

transfers. This does not effect the gains to suppliers and/or buyers of stabilizing particular commodity prices.

24. Expenditure is not the appropriate measure of gains and losses to buyers. To see why this is so, suppose that price falls. Quantity demanded will then increase and total expenditure may increase, but buyers clearly can not be worse off when price falls. The appropriate measure is consumers' surplus, which is defined as the total value that buyers place on the quantity demanded less their expenditure. Consumers' surplus, and the way in which it is measured, are discussed further in ch. 4.

25. Namely, the futures price for August that prevails at the time of the sale in April.

26. Profitable speculation will generally be stabilizing, since, for example, a profit is made on material purchased "now" only if it is resold at a higher price. This argument is presented in M. Friedman, Essays in Positive Economics (Chicago, 1953), p. 175. For counter arguments see W. Baumol, "Speculation, Profitability and Stability," Review of Economics and Statistics 39 (1957): 263-271; and H. Johnson, "Destabilizing Speculation: A General Equilibrium Approach," Journal of Political Economy 84 (1976), 109-122.

27. See B. Maissell, "Some Welfare Implications of International Price Stabilization," Journal of Political Economy 68 (1970): 404-417.

28. If this is so, it might be asked why buyers and sellers do not organize a buffer stock. It may simply be that the costs of a buffer stock exceed the benefits, but there are two other possibilities. First, it is costly to organize the many participants in a market. A second difficulty is what is known as the "free rider problem." If a buffer stock were organized, its benefit would go to all suppliers or buyers whether or not they contributed.

CHAPTER 3

TYPES OF COMMODITY AGREEMENTS

There is little point in maintaining the distinction between reduced price fluctuations and higher prices if commodity agreements invariably increase average price. Whether they would in fact do so turns in part on the effects of creating an organization to intervene in a market. The organization, as such, would provide suppliers with a means to cooperate in raising prices. Furthermore, price, and perhaps supply, would become matters for negotiation between buyers and sellers, and to the extent that suppliers are dominant, the organization created would act as a cartel.

These comments do not, however, exhaust what can be said about the operation of commodity agreements. "Commodity agreement" is a generic term that covers a variety of arrangements. Different choices on specific provisions give commodity agreements which serve different objectives and face different problems. The question, then, is: given the agreement's objective -- higher price or reduced period-to-period variation in price -- which specific mechanisms are required and which are unacceptable?

The first two sections of this chapter take up, in order, pure buffer stocks and commodity cartels. This material provides

the basis for the third section's discussions of the mixed type of commodity agreements that come up in practice.

PURE BUFFER STOCKS

The idea of a pure buffer stock assumes the existence of an organized market in the commodity.[1] A centrally held stock is clearly possible in other cases. However, there is no need to create a buffer stock to stabilize price if price is set by suppliers or is under some other form of administrative control.

The purpose of an exchange is to establish the price that balances supply and demand. Since orders to buy and sell are directly registered on the market,[2] it is not surprising that exchanges generally do this job well and that the price established is very sensitive to changes in supply and demand. As supply and/or demand for individual commodities can change radically over relatively short periods of time, it is also not surprising to find that commodity prices exhibit wide fluctuations.

A pure buffer stock is a means for reducing the magnitude of price fluctuations. In practice, this means that the International Commodity Organization (ICO) would trade on one or more of the exchanges in an attempt to stabilize the commodity's price. More precisely, a target price would be established and the ICO's managers would be instructed to trade so as to keep price within (say) $\pm$10 percent of the target price.[3]

A buffer stock is only intended to even out short-term, transitory changes in prices; it is not intended to alter the

average level of price from what it would be in the absence of a buffer stock. Something like this thought is often expressed by saying that the target price should follow the trend in price. For reasons that are developed below, this rule can be treacherous. Although perhaps a counsel of perfection, the appropriate rule for a pure buffer stock is to set the target price equal to long-run average cost of production, where average cost is defined to include the competitive return on capital employed.[4]

The argument behind this rule turns on the proposition that price in a competitive market tends towards the long-run average cost of efficient operations. This result is guaranteed by entry and exit. If price falls below long-run average cost, firms leave the market, supply is thereby reduced and price rises. Conversely, if price rises above long-run average cost, additional supply is attracted and price is bid down. Given, then, that a pure buffer stock is not intended to alter the average level of price, target price should be set equal to long-run average cost.

Figure 3-1 describes the operations of a buffer stock for a simple case. It is assumed that the demand curve (D) remains stable while supply varies from S_1 (bad crop years) to S_2 (good crop years). In the absence of a buffer stock, price would be P_1 in bad crop years and P_2 in good crop years. Target price is $\bar{P}$, which is assumed to be equal to long-run average cost, and the lower and upper bounds to be defended are P' and P" respectively. When supply is at S_1, the buffer stock would be required to make sales equal to the difference between demand (q_d") and production (q_s")

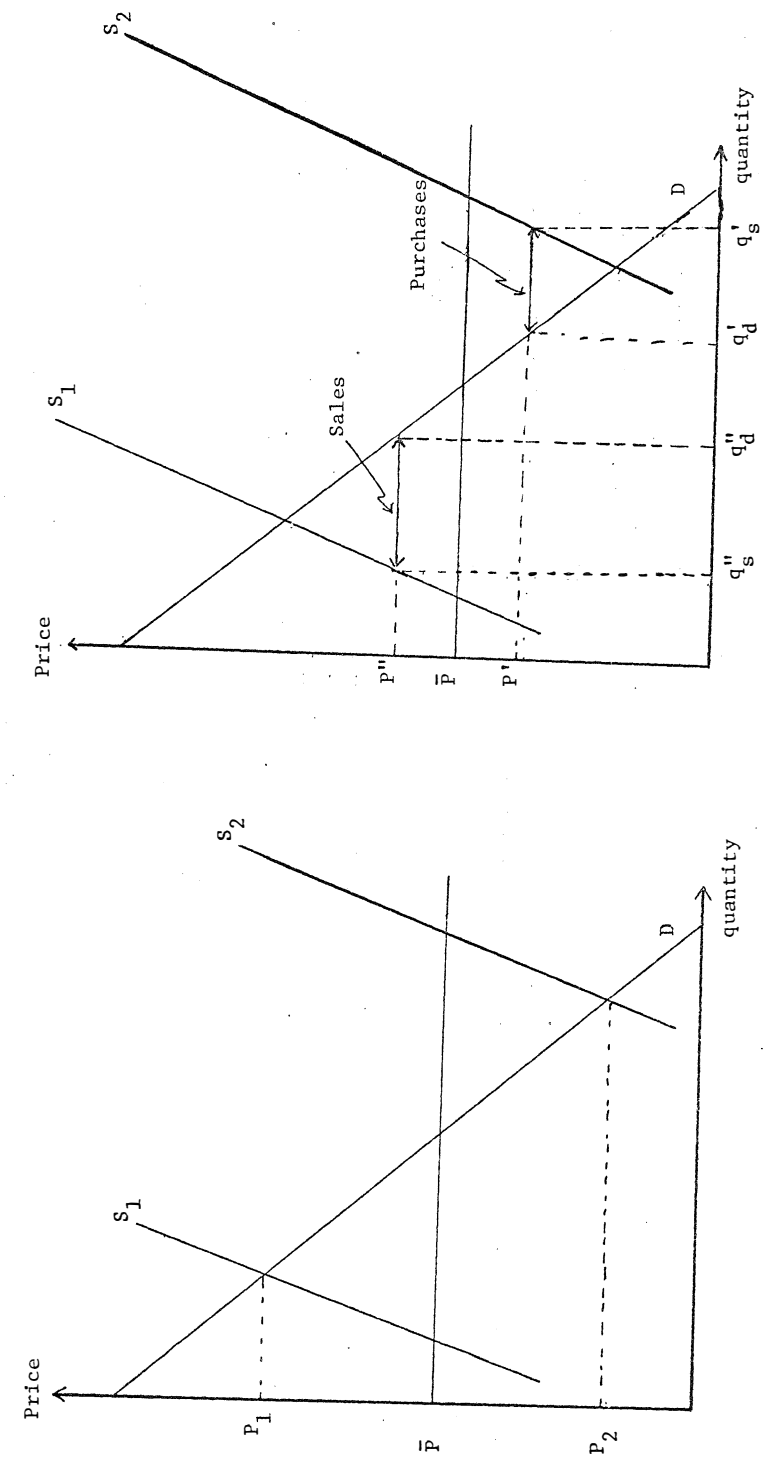


Figure 3-1
Buffer Stock Purchases and Sales When Only Supply Varies

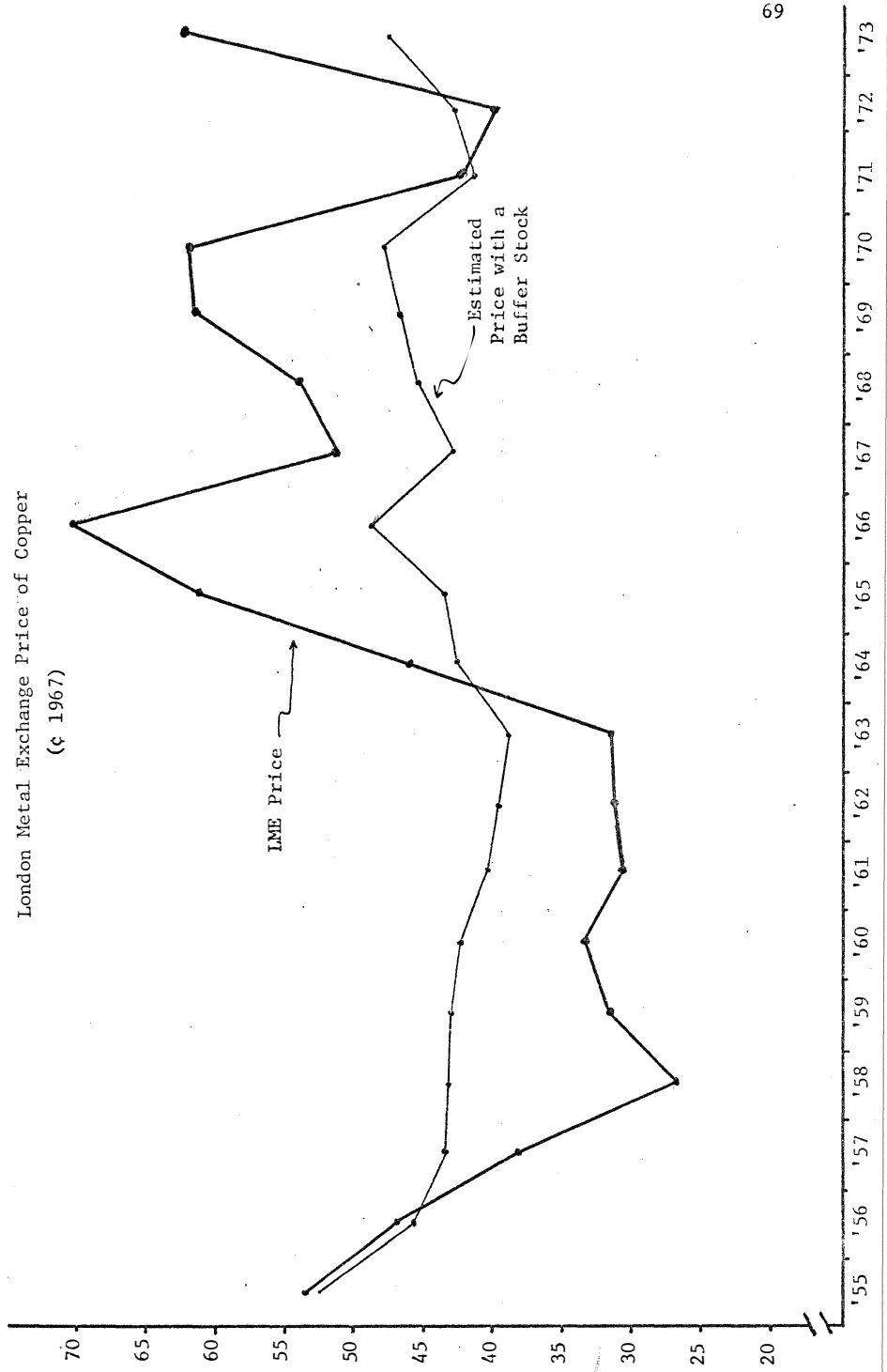
at price P". When supply is at S_2, the buffer stock would make sales equal to $q'_s - q'_d$.

Figure 3-2 shows estimates of the effects on price that a buffer stock for copper would have had over the years 1955-1973. The estimates were computed using an econometric model of the industry.[5] The buffer stock would have supported the price of copper through the early 1960's and by selling, would have avoided the high prices that prevailed during 1965-1970 and again in 1973. This example is almost certainly characteristic. There is no real doubt that a properly managed buffer stock could provide a high degree of price stability. This does not mean, however, that a buffer stock would necessarily stabilize price. Operation of a buffer stock is not nearly so simple in practice as it is in broad concept.

The problems grow out of the difficulties of establishing a target price. Long-run average cost is very hard to measure and there is no simple rule that is guaranteed to produce a tolerably close approximation to long-run average cost. As a practical matter, the best that could be hoped for is that the target price would be negotiated on the basis of long-run average cost.

The market would provide evidence of mistakes in setting the target price. If the target price were set below long-run average cost, production would decline and, once the stock was exhausted, the price could not be held. If price were set above long-run average cost, supply would exceed demand and when the buffer stock reached the limit of its ability to purchase "excess supply,"

Figure 3-2
Estimated Effects of A Buffer Stock on the London Metal Exchange Price of Copper
(¢ 1967)



price would fall. If these signals are correctly perceived and acted upon, small errors in setting the target price are tolerable. The danger lies in the possibility that market signals will be misinterpreted or, even if correctly interpreted, not acted upon.

A buffer stock is likely to work best when structural, technological and cost factors change slowly. In that case, price will fluctuate about a constant value or a stable trend. In agricultural markets, for example, large price changes are usually due to year-to-year variations in supply. The buffer stock would (basically) buy in good crop years and sell in bad crop years.[6] Problems arise, however, when there are permanent shifts in the determinants of supply or damand.

Suppose, for example, that technological improvement of a substitute product results in a large decrease in demand. The market adjustments that would occur in this situation are as follows:

1. Price will initially fall below long-run average cost;
2. All suppliers will incur losses on a long-term basis; marginal suppliers may be forced out immediately; there will be no new entry and existing capacity will not be replaced as it wears out;
3. As supply falls, price will rise toward long-run average cost;
4. A new equilibrium is eventually established with price equal to long-run average cost but with consumption and supply reduced in accord with the lower level of demand.

If the decline in demand were temporary, the buffer stock should purchase so as to support price at the pre-set lower bound. However, given that the decline in demand is permanent, an attempt to support the price will slow down the adjustment process and lead to an ever increasing stock. Consequently a buffer stock should not attempt to support price in the face of permanent decrease in demand.

Technological change that reduces cost presents a similar problem. Once the new technology has been introduced on a significant scale, price will tend to fall toward the average cost with the new technology which is, by hypothesis, less than the average cost with the old. Suppliers who use the old technology will lose money, and will continue to lose money until they leave the market or adopt the new technology. The buffer stock should again, not attempt to support the price.

A large increase in operating cost, while demand remains constant, provides a third and probably more commonly encountered problem. In this case, price will initially rise, but by less than the amount of the increase in average cost,[7] so all firms will experience losses. The adjustment to long-run equilibrium then proceeds as in the first example. In this situation, it would clearly be wrong to attempt to hold price down. It is more likely that managers of a buffer stock would be under pressure to recognize the full impact of the cost increase in the target price. However, doing so would eliminate the incentive to reduce capacity. The correct response for the buffer stock is to let price rise as it will -- i.e., do nothing.

The common element of these three examples is the need for a reduction in capacity. If the ICO blindly defended price bounds, it would thwart the required changes. The direct result would be the accumulation of a large stock. This is clearly not stabilization in the sense of reduced fluctuations in price; a pure buffer stock should act only to filter out the effects of transitory events and not to block permanent changes. Furthermore, if too high a price is set and a large stock accumulated, the solvency of the buffer stock may be threatened. A significant part of any buffer stock would very probably be financed by loans, and the loans would be secured by the material in the stock.[8] If the stock becomes too large, lenders would not only stop extending credit but might also force sale of the stock to cut their losses. The result would be the bankruptcy of the buffer stock and, perhaps, "panic selling," which would be destabilizing.[9]

It is questionable whether an international organization could resist pressures to preserve the status quo. Although this question cannot be answered conclusively, it is possible to list conditions which must be satisfied if a buffer stock is to be limited to the task of smoothing temporary changes in price. First, the ICO should be required to operate so that the buffer stock is liquidated from time to time. Second, the rules of the ICO must recognize the possibility of permanent changes in the market and indicate that these are not to be resisted. Third, the ICO must have a strong capability for analyzing the market and must be under professional, non-politicized management.

COMMODITY CARTELS

At the other extreme from a pure buffer stock is a commodity cartel. The membership of a cartel is limited to suppliers and its central objective is to increase it members' profits by increasing price above the competitive level.

A cartel is usually thought of as selling at a set price agreed on by its members. OPEC, for example, has operated in this way. It is typical for a cartel to directly set price, but this is not necessary. The cartel could retain an open market in the commodity and manipulate price via supply. A buffer stock might then be useful. The target price would be the negotiated cartel price and the cartel buffer stock would buy and sell to absorb the effects of short-run changes in demand and unanticipated changes in supply.

Whether a cartel sells at a set price or uses a market to establish price, it must have a means of limiting output. This cannot be done on a decentralized basis, as the members of the cartel, acting individually, will not produce the amount consistent with the cartel price. To achieve consistency between price and output, it is necessary for the members of the cartel to agree on production or export quotas.[10]

The ancient insight that suppliers can increase their profit by colluding to raise price is valid and important. This is the fact that leads to the formation of cartels and it is the force that makes the problems of negotiating price and market shares solvable. For example, while a low cost producer will prefer a

lower price than will a high cost producer, there is a compromise price which leaves both producers with more profit than they would obtain without agreement. The fact that "cooperation pays" is, however, only one side of the economics of cartels. The other side is the fact that success in raising price sets up forces that work against continued success.

In the short-run, a cartel price above the competitive level provides each member with an incentive to "cheat." Given that the cartel price is above marginal cost, additional sales will increase the suppliers' profit, and increased sales can be attracted by offering a price below the cartel price. "Cheating" on price will be discovered eventually, but, until discovered, it can be profitable. Particularly in periods when all suppliers are operating at much less than capacity, the temptation to cheat can be very nearly irresistible. Widespread "chiseling" creates an untenable situation. The results are a decline in sales by those who adhere to the agreement. They are typically left worse off than they would be without an agreement, and the agreement accordingly collapses.

The upshot of these comments is that an effective cartel requires a mechanism for policing the agreement. The antitrust laws of foreign nations tend to be much more lenient than those of the U.S.,[11] so a national cartel agreement might be enforceable through the courts. But, apart from the tendency towards more stringent antitrust laws, this means is generally not available to international cartels.

The problem of policing is sometimes solved -- or, ameliorated -- by forming a central sales agency. That is, all members of the cartel may agree to make all of their sales to the central agency, which then resells to consumers on behalf of cartel members. Another means that has been used in the past is pooling. Under a pooling scheme, members of the cartel pay in to the cartel organization all of their revenues or profits and then, at regular intervals, receive back a predetermined share of total revenues or profits. Under such a scheme, members of the cartel obviously have an incentive to hide revenues and/or profits but, to the extent that this can be prevented, the incentive to "chisel" on price is removed.

The only other method of policing an agreement is retaliation. In particular, if one member of the cartel is discovered cutting price, the other members may agree to not only match the cut but cut price even further so as to punish the cheater. The knowledge, perhaps based on past demonstrations, that cheating will provoke such a response may deter price cutting.

Historically, the methods that have been described for policing cartel agreements have not been very successful.[12] However, it is suggested below that commodity agreements may have means of policing an agreement that are more effective than those available to a cartel.

In the long-run, a price set above the competitive level works to defeat a cartel by attracting entry. There are cases in which entry is virtually impossible. Or the average costs of

potential entrants may be above those of cartel entrants, in which case entry can be deterred by setting a cartel price just below potential entrants' average cost.[13] However, it is not safe to assume that either of these situations is typical of the commodity industries and entry would then be a crucial problem. The additional supply from new entrants would force price down. The cartel might not collapse as an organization, but with significant new entry it becomes impossible to sustain a price above the competitive level.[14] In short, at least in many cases, an effective cartel requires a means of limiting entry.

Some past agreements have attempted to contain the problem of entry by establishing a "free zone;" i.e., geographic markets in which the market is left to determine price and supply. The total output of new entrants and "overshipments" of members of the agreement are sold in the free zone. The result is a free zone price that is below the agreement's price. This creates a strong incentive for purchasers in the free zone to resell in the "regulated zone," and a variety of imaginative procedures can be devised for doing so.

Valid patents can, of course, be a limitation on entry and various sorts of restrictive practices can sometimes make entry more difficult.[15] But cartels do not have available to them good means of limiting entry, and entry in various forms is a common reason for the failure of cartels. It is again, argued in a later chapter that a system of commodity agreements might be able to do better in this respect than cartels.

RESTRICTIVE COMMODITY AGREEMENTS

The commodity agreements envisioned by the IP are neither pure buffer stocks nor cartels, but have elements of both. It is useful to label such arrangements "restrictive commodity agreements." Specifically, a restrictive commodity agreement differs from a pure buffer stock in that it involves the use of controls on production and exports. It differs from a commodity cartel in that buyers are represented on the ICO and, at least ostensibly, the ICO will not attempt to limit entry. The question taken up here is: to what extent will a restrictive commodity agreement approximate the behavior of a cartel.

Pricing is clearly a key topic. There is no question but that commodity agreements provide a means of setting price. The only issue is whether the price set would be significantly above the competitive level.

There are three mechanisms which might be used to establish a target price. First, the commodity agreement could specify that target price is to equal long-run average cost and delegate the task of estimating long-run average cost to the staff of the ICO. Given the difficulty of making precise and defensible estimates of cost, and the importance of target price to both buyers and sellers, it is unlikely that this approach would be acceptable.

The second possibility is for the members of the ICO to agree on a simple "automatic" rule. The commodity agreements favored by the LDCs would use one of two rules: (1) "indexation"; or (2) a moving average of past prices.[16] Under the first of these

methods, the target price would be set equal to a base price times an index of the prices paid by the LDCs for imports.[17] Changes in commodity prices would then parallel changes in import prices but there would be no intelligible relationship between the target price and either the cartel price or the competitive price. Furthermore, buffer stock operations conducted in terms of such an indexed target price would not be related to cycles in the market and hence would not stabilize commodity prices.

While the use of a moving average rule may appear to be innocuous, it could easily produce a target price that is above the long-run competitive equilibrium. This will occur if the stocks acquired in defending the lower bound on price are insufficient to defend the upper bound. The stock will almost certainly be insufficient if export controls, rather than purchases, are used to support price in slack periods. Even if export controls are not used, the stock will be insufficient if "boom" periods are more frequent and/or more extreme than slack periods, which is not unlikely.

The final alternative is periodic renegotiation of the target price. The rules of the ICO could state that the negotiations are to be on the basis of long-run average cost. However, given the difficulties in measurement, this rule would not be very restrictive. Target price would basically be determined by the bargaining power and positions of buyers and sellers. The buyers' interests would lead them to seek a target price equal to long-run average cost. It is not so clear what position sellers would adopt.

They might recognize that a high price could endanger the existence of the ICO and hence agree to a target price equal to long-run average cost. However, suppliers might well be led by considerations of short-run gain to seek a price above long-run average cost. If they do, the result is likely to be a target price greater than long-run average cost but less than the price sought by sellers.

None of the three available alternatives would be guaranteed to yield a target price near long-run average cost. While indexation is clearly unsatisfactory, whatever approach is chosen it would ultimately be necessary to rely on the skill of the buffer stock managers and the moderation of suppliers. These provide at best weak insurance, and one central fact about commodity agreements is that they provide a means for setting price above the competitive level. Furthermore, one of the stated objectives of the IPs commodity agreements is to increase commodity prices.

A price above the competitive level cannot be sustained without limitations on supply. Restrictive commodity agreements provide the necessary means -- export quotas and production controls. These are blatantly restrictive practices. However, this fact is obscured by the existence of other rationales for "supply management." First, it is argued that production controls and export quotas should be available as "standby measures" to be used when there is a catastrophic decline in demand. The thought is that the use of export quotas or production controls would avoid the very large

expenditures required to support the lower bound on price. While this is correct, the argument does not stand up to close inspection. If export quotas are used, and suppliers are required to accumulate stocks, the ICO becomes a mechanism for coordinating nationally held stocks. Costs are not avoided but only shifted from the buffer stock to suppliers.[18] If production controls are used, and suppliers are not required to accumulate stocks, it is very unlikely that the buffer stock will be able to defend the upper bound on price. The use of production controls, then, runs squarely counter to the goal of reducing period-to-period variations in price.

A second argument for production controls turns on the length of time required to adjust supply. The variable cost of producing some agricultural commodities is very low. For example, once they are planted, cocoa trees will continue to produce for many years with little or no expenditures required. Furthermore, these commodities are often grown by small landowners who cannot readily shift to other crops or occupations. In these circumstances, price can remain very low for several years before producers leave the market.[19]

The argument for production controls associated with these circumstances is simply that a painful adjustment process should be speeded up by direct intervention. This argument might have considerable force if there were no alternative to production controls, but in fact, there is an alternative. The straightforward cure is to allocate investment funds to diversification -- i.e., a changeover to new crops and/or the creation of new industries.

Furthermore, the use of export quotas or production controls tends to lock an industry into an uneconomical pattern. Production by suppliers with high marginal cost should be cut back more than producers with low marginal costs, and low cost suppliers should be allowed to enter.[20] However, high cost producers would oppose these rules and it is unlikely that they could be followed by an international organization. If they are not, the result is excessively high cost and lower profit for the suppliers as a group.

There are two other aspects of "supply management" that should be noted. First, determination of production or export quotas -- i.e., market shares -- would be a devisive issue. Market shares would probably be based on past shares. This can be acceptable in a static situation, but situations in the commodities markets are rarely static and altered circumstances call for painful adjustments. In particular, low cost producers, especially those with unexploited resources, can be expected to claim an increasing share of the market.[21] If demand is not growing with sufficient rapidity -- and demand for most commodities is growing rather slowly -- this can require other producers to reduce output. At a minimum, other producers must "move over," which means accepting a relatively slow rate of growth in their output. Second, as a practical matter supply restrictions probably could not be limited to standby use. Given that price is increased above long-run average cost, there will be chronic excess supply and hence a persistent use for supply management. In this sense, the price increase will create the appearance of a depressed market and the case for limiting the stock by production controls.

Export quotas and production controls have no role to play if the objective of a buffer stock is to reduce period-to-period variations in price. They clearly do have a role to play if the objective is a higher price. A price in excess of average cost can not be sustained unless supply is limited. It is basically for that reason that export quotas and, especially, production controls are important.

The conclusion of the discussion to this point is that commodity agreements along the lines of those specified in the IP have the crucial features of commodity cartels. In particular, restrictive commodity agreements contain the means for increasing price above the competitive level and limiting supply to the level consistent with the increased price.

If price is increased above the competitive level, the policing problems identified in the preceding section arise. The commodity agreements favored by the LDCs would rely on buyers to solve the short-run policing problem. In particular, buyers would agree not to pay less than the agreed price and not to accept any shipments but those certified by the ICO as within the suppliers quota. The IP's commodity agreements do not provide any direct means for limiting entry but the certificate system, together with the power of buyers, might be used to solve the problem. This possibility and the operation of a certificate system, are discussed further in Chapter 6.

The final issue that warrants discussion is the financing of buffer stocks. The LDCs suggest that the costs of the buffer

stock be shared by buyers and sellers.[22] It is argued that buyer contributions are warranted because buyers also benefit by increased price stability, which as was noted in Chapter 2, is possible.

The potential importance of financing arrangements can most easily be grasped by assuming: (1) that target price is set above the competitive level; (2) export quotas and production controls are not used; and (3) buyers pay the entire cost of the buffer stock. In this set of circumstances suppliers will produce far more than the market will absorb at the target price and the "excess production" will be taken off the market by the buffer stock at the buyers' expense. Essentially the same result can occur under less extreme assumptions. Suppose, for example, that target price is set at two and a half times cost and that buyers pay one half the cost of the buffer stock. Suppliers could, then, earn a profit equal to half of their cost by selling excess production to the buffer stock. Of course, it would be necessary to limit this process, and the "obvious" way of doing so is by imposing production controls.

The situation just described is essentially that of domestic agricultural programs; i.e., price supports (target price), government purchases (buffer stock) and acreage allotments (production controls). While the analogy may be startling, it is appropriate. Some, including the leaders of some industrialized nations, have understood commodity agreements in precisely these terms.

CONCLUSIONS

This chapter has pointed out several requirements that must be satisfied by a pure buffer stock. These are as follows:

1. A buffer stock is unsuitable for commodities in which there is no open market;
2. The stock should be self liquidating in the sense that purchases and sales balance over the cycle in demand;
3. Target price must approximate long-run average cost;
4. The buffer stock must have the ability to recognize basic changes in the market and must not act to thwart them; this would require a professional, non-politicized management;
5. Export quotas and production controls should not be used, even on a standby basis.
6. There must be limits on the amount of buyers' contributions to the buffer stock.

If these restrictions are satisfied, the buffer stock would be limited to the task of reducing period-to-period variations in price.

A restrictive commodity agreement -- i.e., an agreement designed to increase price -- would not require a buffer stock. It would require:

1. A mechanism for setting price;
2. A means -- esp. export quotas and/or productions controls -- for limiting supply; and
3. Means for policing the agreement.

The first two of these requirements are easily met. The crucial problem would be that of policing the agreement and, especially, of limiting entry.

These guidelines provide working definitions of a pure buffer stock and a restrictive commodity agreement. As such, they cast in terms of specific mechanisms the preceding chapter's distinction between alternative roles of commodity agreements -- economic development vs. reduction in price fluctuations. A pure buffer stock is designed only to reduce period-to-period variations in price. Restrictive provisions -- especially production controls and export quotas -- are not required for price stabilization in this sense. They serve, instead, as a means of increasing prices and thereby transferring income from the industrialized nations to the LDCs.

FOOTNOTES TO CHAPTER 3

1. Wheat, and many other agricultural commodities, for example, are traded on the Chicago Mercantile Exchange (as well as other exchanges) and several metals are traded on the London Metal Exchange and the New York Commodity Exchange. These markets are open to consumers, suppliers, brokers and, via brokers, anyone else. Other commodities -- bauxite, for example -- are sold at prices announced by producers or at prices negotiated by buyers and sellers. Appendix 4-3 (p. 122) lists organized markets in several major commodities.

2. Price is determined by a type of auction. Orders to buy or sell usually must be placed with authorized traders. While the details of the process vary from one exchange to another, it is typical for traders to gather in a "pit" (really a platform) in which the commodity is traded and shout out the price at which they are currently willing to buy or sell. If demand exceeds supply, it quickly becomes apparent that buyers must increase their bids. Conversely, if supply exceeds demand, bids and closing prices fall.

3. Alternatively, a quantity rule, such as the ratio of stocks to consumption, could be used. The ICO would be instructed to purchase when the stock to consumption ratio rose some fraction above a specified level and to sell when the ratio was some

fraction below target. However, the connection between the stock to consumption ratio is complicated and adequate data on stocks is often unavailable. For these reasons, a quantity rule would typically not be feasible.

4. That is, the return that the capital employed could obtain in its most profitable alternative use. Long-run average cost also includes any "rents" obtained by superior factors of production. For example, even if a superior block of land is owned outright, a rent equal to what it could command on the market would be attributed to it.

5. Both the deflated price of copper and the estimated price with a buffer stock were taken from U.S. Department of the Treasury, Office of Raw Materials and Oceans Policy. A Review of Past and Prospective Commodity Policy for Selected Non-Fuel Minerals, Washington, February, 1976, p.74. The results shown assume that the initial stock is zero and that purchases and sales are made so as to maintain price within $\pm$7.5 percent of the five-year lagged moving average price.

6. Even in this case, sales can be a problem. Considerations of short run profit give sellers an incentive to oppose sales even in periods of strong demand. Unless sales are made at such times, the amount held by the stock will increase over time and the buffer stock will cease to play a stabilizing role.

7. In the short run, suppliers will push production to the point where marginal (or incremental) cost is equal to price. If the price paid for inputs increases, then so does marginal cost. This implies that at the initial price, firms will be willing to supply less than before cost increased. Price consequently rises. But the increase in price leads to a decrease in the quantity purchased. Suppliers are then left with excess capacity which is, loosely speaking, why the initial price increase is less than the increase in average cost.

8. This means all of the stock. For example, a bank or group of banks might loan the buffer stock only two-thirds of the value of the stock, but the loan would be secured by all of the material purchased.

9. The existence of a large stock tends to depress the market, and hence creates the need for continued purchases. The process is in this respect self-feeding.

10. Alternatively, members of the cartel can be assigned particular geographic markets. Then, given that each member of the cartel agrees not to sell outside its assigned market, and that the characteristics of demand do not vary significantly among markets, members of the cartel do not have an incentive to produce more than is consistent with the established price.

Under such a scheme, each member of the cartel is in effect assigned a regional monopoly.

11. Any agreement among U.S. firms to fix price or divide markets within the U.S. is a per se violation of Section 1 of the Sherman Act. The Webb-Pomerene Act, however, permits U.S. firms, subject to certain limitations, to participate in export cartels. Most other developed nations follow a similar practice.

12. Some aspects of the historical record of cartels are briefly reviewed in ch. 5.

13. This is the notion of limit pricing suggested by Joe Bain. See Joe S. Bain, "A Note on Pricing in Monopoly and Oligopoly," American Economic Review 39(1949): 448-464.

14. This does not necesarily imply that it would be unprofitable for existing suppliers to organize a cartel and set a high price. Entry typically requires at least two or three years and may take a decade or more. It can be profitable for suppliers to set a high price and then let that price be eroded by entry. For example, see R. Pindyck, "Gains to Producers from Cartelization of Exhaustible Resources," Massachusetts Institute of Technology, Energy Laboratory World Oil Project, Working Paper MITEL 76-012WP (May, 1976).

15. Restrictive practices -- tie-in sales, reciprocity, requirements selling, etc. -- typically play a prominent role in antitrust cases. However, it is far from clear that use of such practices can effectively exclude from any market a firm who is willing to sell an equivalent product for less than the price charged by existing suppliers.

16. See U.N. Conference on Trade and Development, Trade and Development Board, "An Integrated Programme for Commodities," TB/B/C.1/194 (Oct., 1975), pp. 6-8.

17. The underlying argument, which was mentioned in ch. 1 (p. 4) is that the terms of trade invariably shift against commodities. A much more sensible choice is an index of the cost of production. Indexation would then merely refer to a formula for computing a target price equal to long-run average cost. This procedure would, however, encounter the objections pointed out above -- esp., the difficulty of estimating cost.

18. And if buyers contribute to the buffer stock, the suppliers must lose by this shift.

19. See J. Rowe, Primary Commodities in International Trade (Cambridge University Press, 1965), pp. 189-193.

20. For a case in which this issue appears, see I. Kravis, "International Commodity Agreements to Promote Aid and Efficiency: The Case of Coffee," Canadian Journal of Economics 1 (1968): 295-317.

21. For some examples, see G. Gwyer, "Three Commodity Agreements: The Experience of East Africa," Economic Development and Cultural Change 22 (1972): 465-476.

22. Several different formulas are suggested, but under each the buyers' contribution would be at least one-third of the total. See U.N. Conference on Trade and Development, Trade and Development Board, "An Integrated Programme for Commodities TB/B/C.1/196 (Oct., 1975), pp. 7-10.

CHAPTER 4

PURE BUFFER STOCK ARRANGEMENTS

Extreme fluctuations in price are commonly regarded as at least a nuisance. Accordingly, there would be little objection to an organization that was firmly confined to reducing period-to-period variations in price. If it is assumed that a pure buffer stock would be limited to this task, the major question is whether the benefits of reducing variations in price exceed the costs of the operation. The ambiguous policy that the U.S. has adopted adds spice to this issue. The U.S. has agreed to consider commodity agreements, including buffer stocks on a case by case basis, which raises the question: In what cases is a buffer stock economically warranted?

The first two sections of this chapter take up successively the costs and the benefits of pure buffer stocks. The final section presents a tentative identification of the commodities which are the most promising candidates for buffer stocks.

COSTS OF BUFFER STOCKS

Discussions of commodity agreements often seem to suppose that the capital costs of establishing a buffer stock would be modest. This assumption probably reflects the fact that the tin

buffer stock -- which is the only buffer stock to operate in the post-war years -- is small and relatively inexpensive. But the tin buffer stock has bee. too small to have a marked effect on the price of tin.[1] In many cases, at least, a relatively large buffer stock will be required to obtain a significant degree of price stability. For example, the maximum size of the copper stock for the scenario behind Figure 3-2 was 4.8 million tons, which would have had an acquisition cost of roughly $5 billion.[2]

The size of the buffer stock that an ICO must be prepared to acquire obviously depends on the magnitude of shifts in supply and demand and the degree of price stability that is desired. To take a simple case, suppose that demand remains constant while supply varies [cf. Figure 3-1, p. 67]. Denote base (or average) production by $\bar{q}$ and the amount that the buffer stock must acquire in a good crop year by S. Let $s = S/\bar{q}$ be the buffer stock's purchases as a fraction of base production and let f be the fraction by which price is permitted to decline from the target price. Assuming that the supply and demand curves are straight lines, it is shown in Appendix 4-1 that:

$$s = \left(\frac{\alpha}{q}\right) d - (\eta_s - \eta_d) f, \qquad (4\text{-}1)$$

where α is the intercept of the supply curve, d is the fraction by which the supply curve shifts out in good crop years and η_s and η_d are, respectively, the elasticities of supply and demand. For values characteristic of the coffee industry:

$$s = .67*d - .60*f. \qquad (4\text{-}2)$$

Figure 4-1 is the graph of this relationship for d = .1, d = .2 and d = .3. If supply shifts out by 10 percent (d = .1) in good crop years, the buffer stock must purchase only 0.7 percent of base production to hold price 10 percent below the target price. But for d = 0.2, supporting price at a value 10 percent below the target price would require acquisition of 7.4 percent of base production. In short, the size of a buffer stock required to maintain a given degree of price stability is very sensitive to the magnitude of variation in supply.

Table 4-1 presents the results of similar computations for 15 commodities. It was assumed in making these computations that supply or, for rubber and the metals, demand, varies by ± 10 percent, and that the buffer stock trades to keep price within ±10 percent of a target level. Other values that entered the computation appear in the right hand columns of the table. The formula employed is explained in Appendix 4-1. It should be emphasized that the first column gives estimates of the costs of purchases in a single year, for a given increase in supply or decrease in demand. If two or three good crop years, for example, occurred in succession, the capital cost of the stock required to support the price would be double or triple the values shown.

The estimated maximum capital costs range from a low of about $7 million (sisal) to a high of $5 billion (copper). The sum of the maximum estimated initial outlays shown in Table 4-1 is $15.7 billion or, excluding copper, $10.7 billion. These figures compare with a total flow of aid to the LDCs in 1972 of $11.8 billion (cf. Table 5-3, below, p. 134).

Figure 4-1

Variation of Maximum Buffer Stock Size, as a Fraction of Base Production, With the Degree of Price Stability

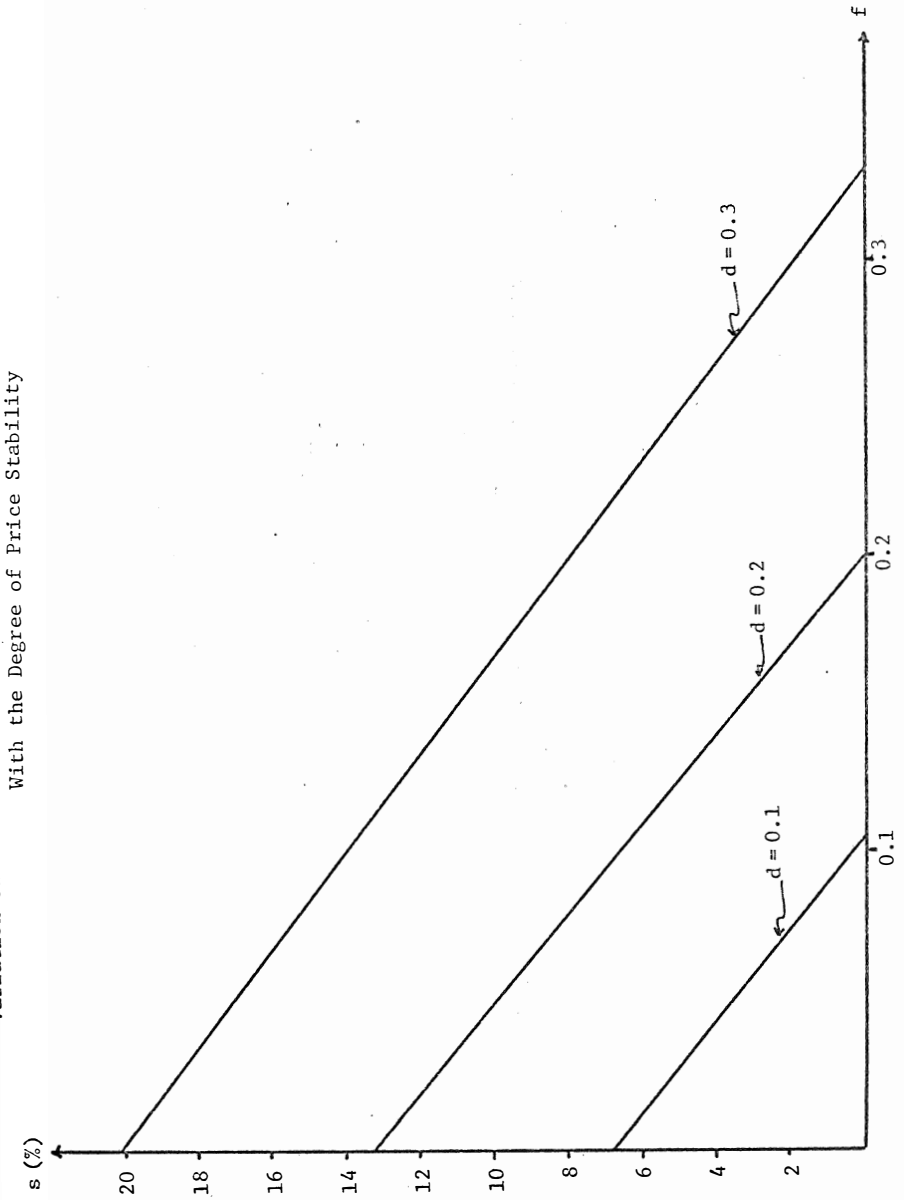


Table 4-1

Estimated Maximum Capital Costs of Buffer Stocks[1/]

	Cost (million $)	Maximum Stock as a Percent of Base Production	Assumptions: Elasticity of Supply	Elasticity of Demand	Base Production	Price
Cocoa	2/	2/	.34	-.32	3,488,000 l.t.	$821.43/l.t.
Coffee	24.8	0.7	.33	-.27	66,319,000 bags	$53.50/bag
Tea	18.9	2.2	.31	-.16	1,244,000 m.t.	$690.18/m.t.
Wool	392.6	2.6	.25	-.24	9,742,000 m.t.	$1,550.00/m.t.
Cotton	2/	2/	.71	-.27	11,324,000 m.t.	$526.10/m.t.
Wheat	2/	2/	.71	-.20	321.3 million m.t.	$73.21/m.t.
Rice	1109.6	5.4	.20	-.06	187.2 million m.t.	$109.77/m.t.
Sugar	725.3	4.0	.22	-.16	71.4 million m.t.	$253.96/m.t.
Jute	2/	2/	.30	-.50	.722 million m.t.	$326.3/m.t.
Sisal	7.2	4.0	.15	-.30	.385 million m.t.	$466.00/m.t.
Rubber 3/	123.1	8.5	.15	-.40	2,628.4 million k.g.	$0.55/k.g.
Copper 4/	5,000	--	--	--	--	--
Tin 4/	800	--	--	--	--	--
Iron Ore 3/	262.7	8.5	.15	-.10	254.6 million m.t.	12.14/m.t.
Bauxite 3/	76.2	8.0	.20	-.02	68.90 million m.t.	13.82/m.t.

Sources: See Appendix 4-1

1/ The estimate is of the maximum addition to the stock in a single year under certain assumptions (cf. Appendix 4-1). The estimated values would increase if the assumed conditions persisted for more than one year.

2/ A 10% increase in supply would not threaten a price floor 10% below the base price.

3/ Computed for a 10% variation in demand rather than supply.

4/ U.S. Department of the Treasury, Office of Raw Materials and Oceans Policy, op. cit.

One interesting question is whether pooling buffer stock outlays would reduce the amount of capital required. If the commodity markets move together, as they seemed to be in 1973-1974, then pooling would not reduce capital costs. However, if the markets move independently, then the stocks for some commodities will tend to be "full" while those for others are "empty," so that pooling would reduce capital costs. Table 4-2 shows the simple correlations between the deflated prices of the 16 commodities that appeared in Table 2-2 (p. 31).[3] It is remarkable that 64 out of the 120 correlations are either negative or zero. Commodity prices then do not move in lock step. For example, the price of sugar tended to be high at times when the price of jute was low. This suggests that pooling would have substantial advantages.[4]

Capital costs, although relevant, are not the correct measure of the costs of a buffer stock operation. There are four components to the costs of a buffer stock. First, there is the interest cost on the funds employed, and, second, the costs of storage. Third, and probably the smallest part of cost, are the administrative expenses of the buffer stock organization. The final component is "trading cost;" i.e., the difference between the acquisition cost of the stock and the revenue obtained when it is sold plus any brokerage fees. A trading profit is entirely possible but so is a loss.

The costs of the copper buffer stock for the scenario shown in Figure 3-2 were estimated to be an average of about $27 million per year. The estimated costs of the tin stock are much

Table 4-2

Correlations Between Deflated Commodity Prices

	bananas	cocoa	coffee	tea	wheat	rice	cotton	jute	sisal	wool	beef	sugar	rubber	copper	tin	iron
bananas	1															
cocoa	-.24	1														
coffee	.61	.08	1													
tea	.79	-.28	.43	1												
wheat	-.57	.41	-.32	-.39	1											
rice	-.53	.54	-.39	-.52	.82	1										
cotton	-.02	.30	.38	.19	.32	.08	1									
jute	.07	-.38	-.22	-.02	-.39	-.18	-.56	1								
sisal	-.41	.15	-.44	-.22	.79	.47	.13	-.41	1							
wool	.11	.06	.19	.16	.53	.20	.58	-.34	.40	1						
beef	-.75	.05	-.28	-.85	.23	.17	0	0	.13	-.12	1					
sugar	-.50	.33	-.24	-.47	.62	.41	.06	-.54	.82	.15	.36	1				
rubber	.52	.09	.39	.82	-.07	-.29	.45	-.10	-.02	.37	-.71	-.28	1			
copper	-.12	0	0	-.44	.08	.32	-.28	.47	-.21	-.16	.28	-.25	-.41	1		
tin	-.51	.06	-.39	-.55	.13	.38	-.27	.23	-.13	-.34	.40	0	-.47	.50	1	
iron	.71	-.10	.65	.86	-.42	-.58	.31	-.23	-.32	.19	-.72	-.33	.75	-.58	-.55	1

less -- roughly $1 million per year.[5] Comparable estimates for other commodities are not available. It is possible, however, to form an impression of how large these costs are likely to be.

The administrative costs of a buffer stock operation would be small in relation to other cost components and to net benefits,[6] and it can be assumed that the average trading costs of a well managed pure buffer stock would be zero.[7] Warehousing costs would also be small for the metals and most agricultural commodities, although storage costs would be appreciable for cocoa, coffee, sugar and tea.

This leaves capital costs, about which more can be said. The buffer stock would not be at its maximum value at all times. Suppose that there is a regular and recurring cycle of good, average and bad years. The stock would be built up during the course of the good year, held during the average year and sold during the bad year. The average value of the stock would then be two-thirds of the maximum value. If good and bad years alternated, the average value of the stock would be half the maximum value.

The commodity markets do not follow either of these simple patterns. However, the upper and lower price bounds for a price buffer stock would be chosen so that purchases and sales balance out. Given that changes in demand and supply occur fairly often, this suggests that the buffer stock would be buying, holding and selling with roughly equal frequency. If so, the average value of the buffer stock would be about one-half to two-thirds of the maximum value.

It is reasonable to assume that the relevant interest rate for a pure buffer stock would be in the range 9-15 percent. Then, given that the average amount held is one-half to two-thirds of the maximum, the annual average interest cost would be 6-10 percent of the maximum value of the buffer stock.[9] The total cost, including administrative and storage costs, would be a bit larger.

This concludes the discussion of buffer stock costs. The next task is to form an impression of the benefits to reducing price fluctuations.

BENEFITS OF PURE BUFFER STOCKS

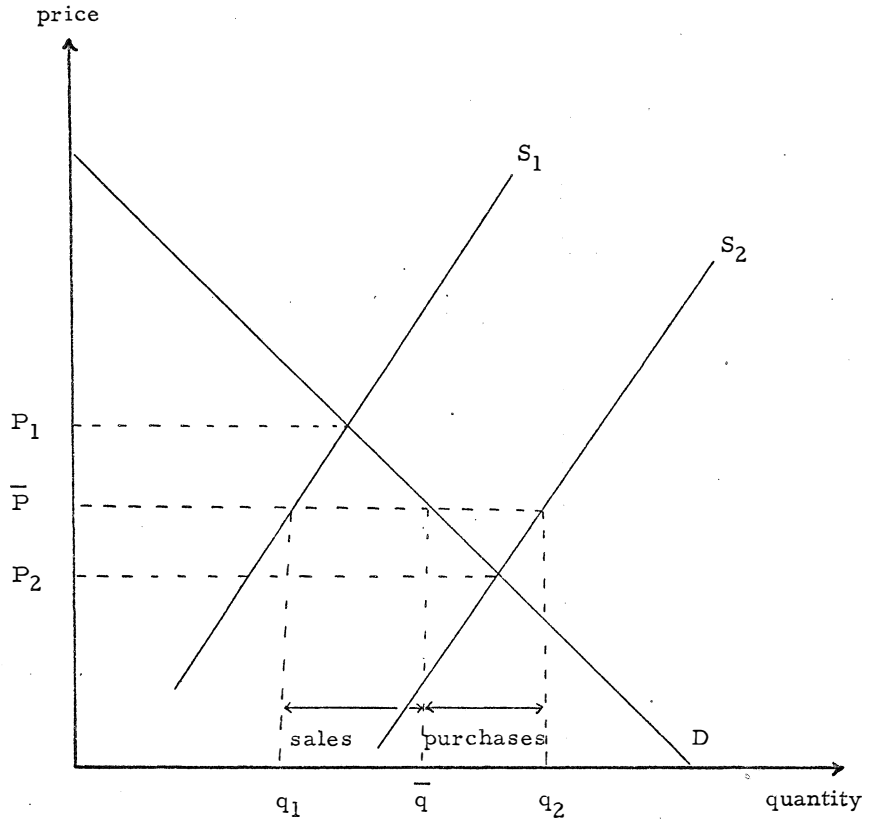
The benefits that might flow from a reduction in period-to-period variations in prices were discussed in Chapter 2. Most of the arguments used to justify buffer stocks were found to be insubstantial. The one solid argument identified had to do with the effects of price instability on the gains to buyers and sellers from exchange.

This section presents numerical examples of the effects of price stabilization on suppliers' profit and consumers' surplus. The computations employ results obtained by Maissel. The formulas used, along with the assumptions made, are presented in Appendix 4-2.

It is useful, before stating the results, to sketch the nature of the computations. Figure 4-2 describes the first case to be considered. The demand curve (D) is assumed to remain stable, while supply varies between S_1 (bad crop years) and S_2 (good crop

Figure 4-2

Price Stabilization When Only Supply Varies



years). In the absence of a buffer stock, price would be P_1 in bad crop years and P_2 in good crop years. The buffer stock would trade so as to maintain price at $\bar{P}$, which is the average of P_1 and P_2. In bad crop years, the buffer stock would sell to hold price at $\bar{P}$. Consumption would remain at $\bar{q}$, production would be q_1 and buffer stock sales would be $\bar{q}-q_1$. When supply is at S_2, production would be q_2 and the buffer stock would purchase $q_2-\bar{q}$ so as to maintain price at $\bar{P}$.

Figure 4-3 shows the effect of price stabilization on suppliers. Suppliers' revenue is price times quantity and the total cost of producing any output q is equal to the area under the supply curve to q. It can be seen, then, that because of the buffer stock sales, suppliers lose profits equal in magnitude to the cross-hatched area s_1. In periods when supply is S_2, the buffer stock would buy to support price at $\bar{P}$, which would increase suppliers' profit by an amount equal to the area s_2. The total gain to suppliers from price stabilization is $G_s = s_2 - s_1$. It can be seen by superimposing the graph on the right of Figure 4-3 on the graph on the left that s_2 is larger than s_1, so suppliers gain by price stabilization when demand is stable and supply varies.

Figure 4-4 shows the effects of price stabilization on consumers. For the reasons brought out earlier [note 24, p. 62], the appropriate measures of gains and losses to buyers is not their expenditure but consumers' surplus. Consumers' surplus is defined as the total value placed on the quantity consumed, which is measured by the area under the demand curve,[10] less expenditure.

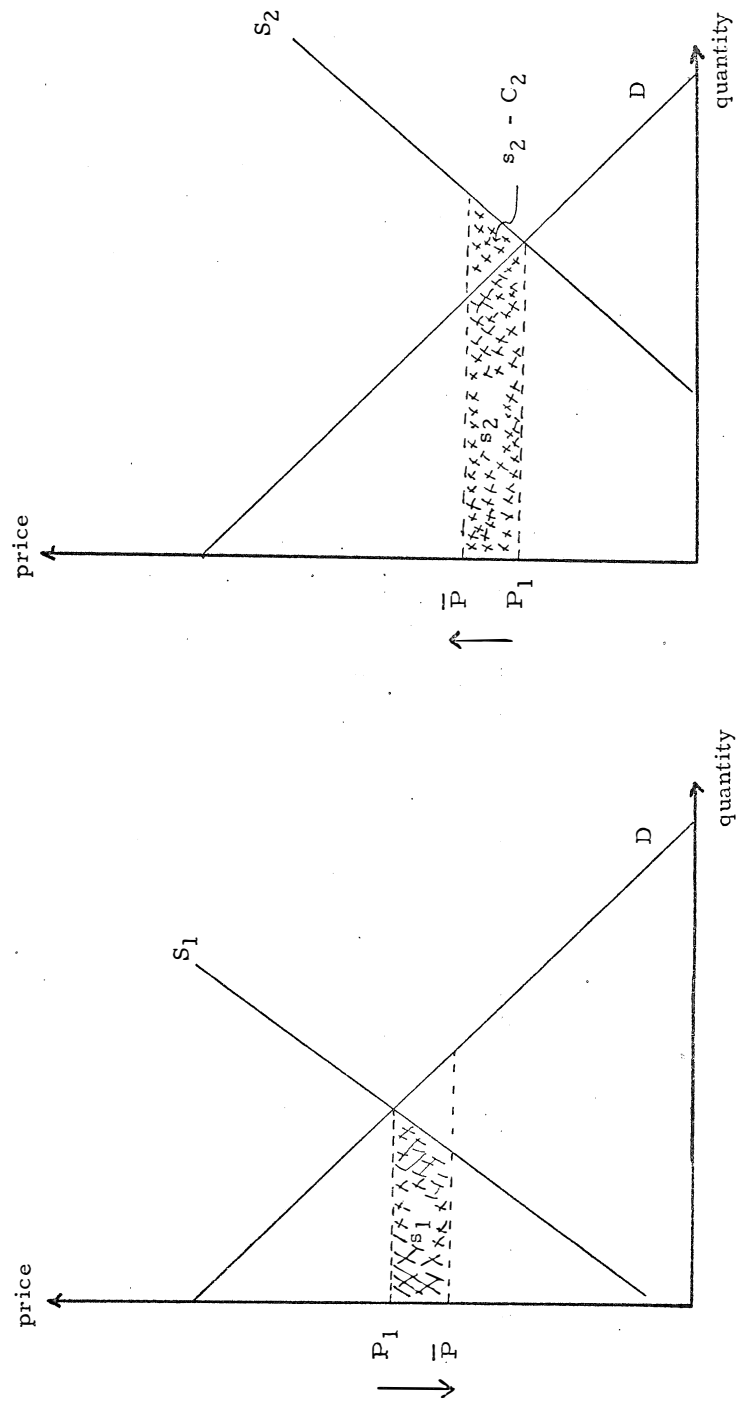


Figure 4-3
Gain to Suppliers From Price Stabilization When Only Supply Varies

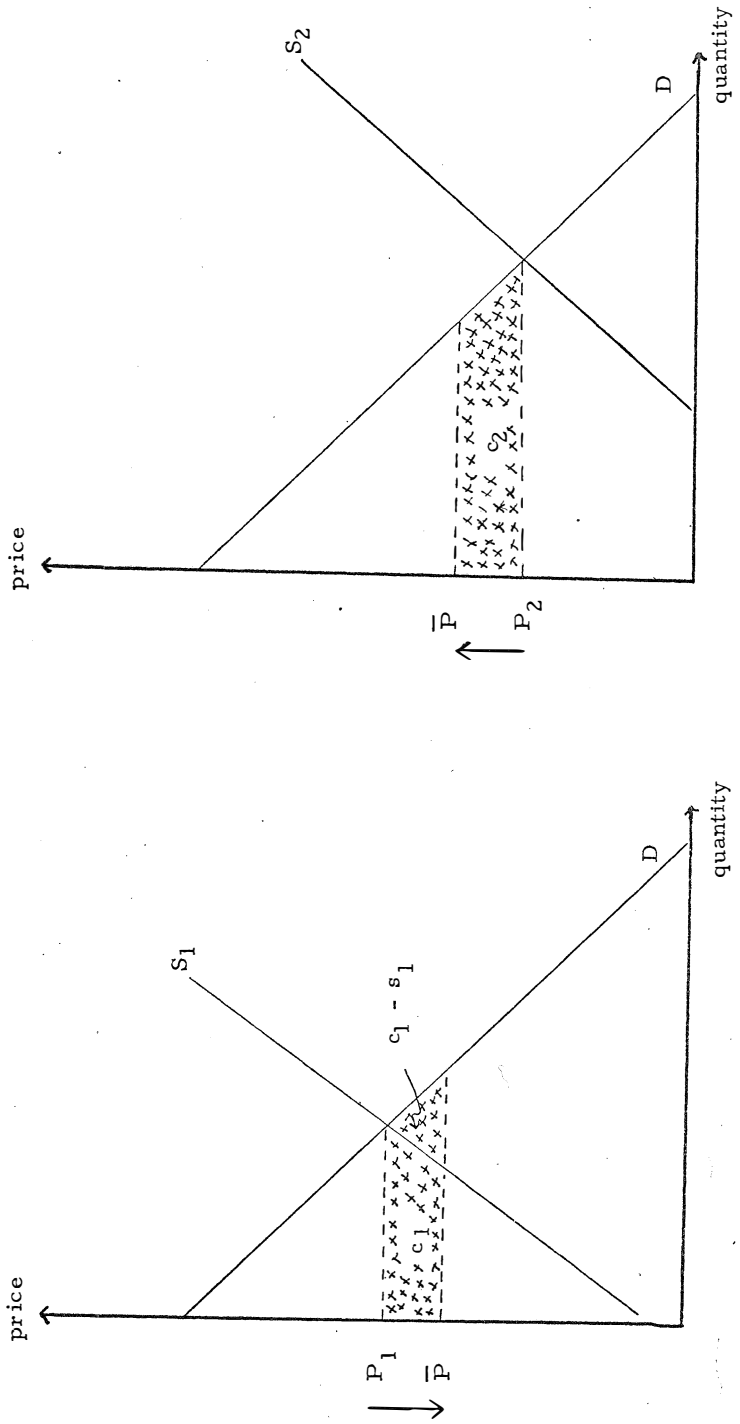


Figure 4-4
Loss to Buyers From Price Stabilization When Only Supply Varies

For example, looking at the right panel of Figure 4-4, when price is P_2 quantity q_2 is purchased and expenditure is equal to the area of the rectangle with height P_2 and base q_2. Consumers' surplus is then the area of the triangle lying above the line from P_2 to the demand curve. Increasing price to $\bar{P}$ then reduces consumers' surplus by an amount equal to the area labeled c_2. Similarly, when the buffer stock acts to hold price down to $\bar{P}$, consumers gain an amount equal to the area c_1. The net gain to consumers is $G_c = c_1 - c_2$. It is clear from the figure that c_2 exceeds c_1, so G_c is negative; i.e., consumers are net losers from price stabilization if supply varies while demand is constant.

The total gains to consumers and producers as a group are:

$$G_T = (c_1 - c_2) + (s_2 - s_1). \qquad (4\text{-}3)$$

Rearranging terms:

$$G_T = (c_1 - s_1) + (s_2 - c_2). \qquad (4\text{-}4)$$

The first term in this expression is the net gain to consumers and producers as a group when the buffer stock sells to reduce price from P_1 to $\bar{P}$. Looking back at Figures 4-3 and 4-4, it is clear that c_1 is greater than s_1; i.e., consumers gain more by the price reduction than suppliers lose. The second term in 4-2 is the net gain when price is supported. Again comparing Figures 4-2 and 4-3, it is clear that suppliers gain more when the buffer stock acts to support price at $\bar{P}$ than consumers lose. Since both terms in 4-4

are positive, G_T is necessarily positive; i.e., there are net gains from price stabilization to buyers and sellers as a group.

A second relevant case is shown in Figure 4-5. It is assumed in this case that supply is stable but that demand varies. The buffer stock would, again, trade so as to stabilize price at its average value $\bar{P}$. For this case arguments that parallel those used above lead to these conclusions:

1. Consumers are net gainers and suppliers are net losers from price stabilization.
2. Consumers gain more than suppliers lose when price is held down; and suppliers gain more than consumers lose when price is supported.
3. There are net gains to buyers and sellers as a group from price stabilization.

In the general case where both supply and demand vary, both buyers and sellers may be net gainers. However, suppliers may be net gainers while consumers are net losers; or consumers may gain while suppliers lose. The nature of the outcome, in this case, depends on the magnitudes of the elasticities of supply and demand and the extent of variation in supply and demand. The only general statement that can be made is that there are net gains from price stabilization to buyers and sellers as a group.

Table 4-3 presents illustrative values of the expected (or average) annual gains to price stabilization for each of the three cases identified. The assumptions used in making these

Figure 4-5

Price Stabilization When Only Demand Varies

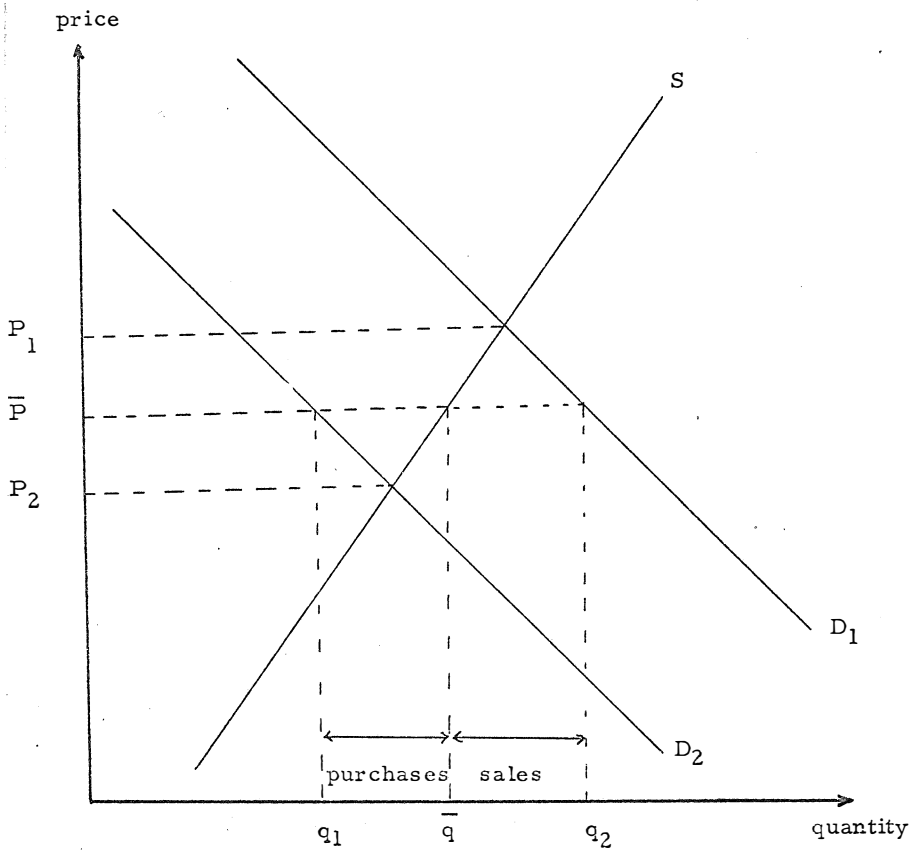


Table 4-3

Expected Annual Gains From Price Stabilization
($ million)

	Supply varies			Demand varies			Both vary		
	producers	consumers	total	producers	consumers	total	producers	consumers	total
Cocoa	21.4	-7.0	14.5	-7.5	21.9	14.5	14.0	14.9	28.9
Coffee	28.6	-8.9	19.7	-10.8	30.6	19.7	17.7	21.7	39.4
Tea	8.2	-2.1	6.1	-4.0	10.1	6.1	4.1	8.0	12.2
Wool	153.0	-50.3	102.7	-52.4	155.1	102.7	100.6	104.8	205.4
Cotton	25.8	-5.6	20.3	-14.7	34.9	20.3	11.2	29.4	40.5
Wheat	105.1	-18.9	86.2	-67.2	153.4	86.2	37.9	134.5	172.3
Rice	324.2	-60.8	263.4	-202.7	466.1	263.4	121.6	405.3	526.9
Sugar	226.0	-67.0	159.0	-92.1	251.1	159.0	133.9	184.2	318.1
Bananas	1.8	-0.5	1.3	-0.7	2.0	1.3	1.1	1.4	2.5
Jute	1.6	-0.6	1.0	-0.4	1.4	1.0	1.2	0.7	2.0
Sisal	2.2	-0.9	1.3	-0.4	1.8	1.3	1.8	0.9	2.7
Beef	0.8	-0.3	0.5	-0.2	0.7	0.5	0.6	0.4	1.0
Rubber	15.2	-6.4	8.8	-2.4	11.2	8.8	12.8	4.8	17.6
Copper	114.0	-31.9	82.1	-50.2	132.3	82.1	63.9	100.4	164.2
Tin	27.3	-8.4	18.9	-10.5	29.4	18.9	16.8	21.0	37.8
Iron	57.7	-16.5	41.2	-24.7	65.9	41.2	33.0	49.5	82.4
Bauxite	15.8	-1.3	14.5	-13.2	27.7	14.5	2.6	26.3	29.0

Source: See Appendix 4-2.

computations are stated in Appendix 4-2. Briefly, the computations rest on measured values of elasticities and hypothetical variations in supply and demand. The potential gains from price stabilization for wool, wheat, rice, sugar and copper are fairly substantial, but, in most cases the benefits, both gross and net, are small.

GUIDELINES ON BUFFER STOCKS

The estimates that have been presented are in large part hypothetical. They can, nevertheless, at least be used to illustrate what a cost-benefit analysis of buffer stock would look like and to provide a first guess on what the outcome of the complete cost-benefit analysis would be.

Table 4-4 shows the gains to stabilization when only supply or only demand varies (Table 4-3) and 5 percent and 15 percent of estimated maximum capital costs. Both the computation of benefits and costs assume that the maximum variation in supply or, for rubber and the metals, demand, is 10 percent from the base level. The benefits are for perfect price stabilization. The capital cost figures used are correspondingly those for buffer stocks large enough to maintain exactly the target price in the face of a 10 percent variation in supply or demand.[11]

Estimated annual net benefits exceed 5 percent of estimated capital costs for all of the commodities except rubber and copper. Estimated annual net benefits, however, are less than 15 percent of estimated capital costs for all commodities except rice.

Table 4-4

Comparison of Net Benefits to Price Stabilization When Only Supply Varies With 5% and 15% of Estimates Maximum Capital Cost
($ million)

	Benefits to Sellers	Net Benefits	Fraction of Maximum Capital Cost 5%	15%
Cocoa	21.4	14.5	9.5	28.5
Coffee	28.6	19.7	11.9	35.7
Tea	8.2	6.1	3.0	9.0
Wool	153.0	102.7	56.6	169.8
Cotton	25.8	20.3	8.7	26.1
Wheat	105.1	86.2	34.1	102.3
Rice	324.2	263.4	82.4	247.2
Sugar	226.0	159.0	70.8	212.4
Jute	1.6	1.0	0.8	2.4
Sisal	2.2	1.3	0.7	2.1
Rubber	-2.4	8.8	10.1	30.3
Copper	-50.2	82.1	250	750
Tin	-10.5	18.9	40	120.
Iron	-24.7	41.2	17.0	51.0
Bauxite	-13.2	14.5	4.8	14.4

The overall impression conveyed by Table 4-4 is that the costs of buffer stocks for the commodities considered are of very approximately the same magnitude as the benefits.

Some of the ambiguity suggested by Table 4-4 can be resolved by applying reasonable negative tests of the suitability of buffer stocks, First, a buffer stock makes no sense for commodities in which there is no open market. This test rules out buffer stocks in iron, bananas, bauxite and rice -- at least until markets in these commodities are organized. A second simple test is provided by the costs of storage. This consideration almost certainly should rule out buffer stocks in meats and bananas. Coffee, cocoa and tea have the same problem, but less severely. Stocks in these commodities must be "rolled over" -- i.e., the commodity must be sold after being held for a certain amount of time. This fact limits the amount of time that a stock can be held, and, hence, the amount of material that can be held off the market.

A third negative test is the orgin of the commodity in world trade. Referring ahead to Table 5-2 (p. 132), DCs are the principal exporters of wheat, rice, wool and iron. As the concern is primarily with the prices of commodities exported by LDCs, there does not seem to be much point in creating buffer stocks in these commodities.[12] Furthermore, supply probably varies substantially more than demand for wheat, rice and wool, and in this case, buyers are net losers from price stabilization.

A final -- and probably more controversial -- negative test is structural characteristics of the industry. The danger

that a buffer stock will be used as a restrictive agreement is acute to the extent that concentration and barriers to entry are high. Production of cocoa and coffee is highly concentrated, but entry into these industries is relatively easy. The copper and tin industries are both highly concentrated and relatively difficult to enter and are, for those reasons, probably not suitable candidates for buffer stocks.

The survivors of these negative tests are: cotton, sugar, jute, sisal, and rubber. To proceed with the analysis of these commodities, it is necessary to employ positive indicators of benefits.

One test of the benefits to buffer stocks is the degree of price instability. Looking back at Table 2-2 (p.31), the prices of the surviving commodities ranked from least to most stable are: sugar, sisal, rubber, cotton, and jute. The price of sugar is by far the most unstable of this group with a coefficient of variation more than half again as large as that of sisal. A closely related test is the absence of a futures market. (Appendix 4-3 lists the organized markets in major commodities.) There are futures markets in all of the surviving commodities except sisal and jute. Taking these two tests together, sisal and jute appear to be prime candidates for buffer stocks. The net benefits shown in Table 4-3 give a different impression. The net benefits of buffer stocks for sisal and jute are very small. The benefits are much larger for sugar and at least noticeable for cotton and rubber. However, the net benefits of stabilizing the price of rubber do not seem to

compare favorably with costs. Sugar and cotton are relatively easy to store and the industries are relatively unconcentrated and easy to enter, and so would seem to be promising candidates for buffer stocks.

This is only a presumption that might be overturned by detailed empirical research. It should also be emphasized that this discussion has assumed that any organization created would meet the stringent tests of a pure buffer stock set down in Chapter 3. This assumption has been made for the sake of the argument and it is not necessarily realistic.

CONCLUDING COMMENTS

Buffer stocks are often regarded as good or bad as such. This chapter suggests that the reality is much more complicated. The costs of a buffer stock, and the difficulties of buffer stock management vary from one commodity to the next. There is no general presumption that the costs exceed the benefits, or conversely. It does seem clear, however, that buffer stocks have a useful role to play in only a few cases.

The potential importance of pure buffer stocks is limited by their nature. A pure buffer stock would only serve to reduce period-to-period fluctuations in prices, suppliers' incomes and buyers' expenditures. While this case may be very useful, the effects would not be large. Looking back at Table 4-4, the total annual net benefits to perfect price stabilization are only $840 million and the benefits to suppliers -- given than only supply

varies -- are just over $1.1 billion. On this basis, it seems to be very unlikely that a system of pure buffer stocks would have more than marginal effects on the LDCs or would work sweeping changes in world commodity trade.

Appendix 4-1

Maximum Capital Requirements of Buffer Stocks

This appendix derives the formula used to compute the estimates, presented in Table 4-1 of the maximum capital requirements of buffer stocks. Denote by $\bar{P}$ the target price and by P" and P' respectively the upper and lower prices that are to be defended. Let f be the fraction by which price is permitted to vary from $\bar{P}$. The bounds on price can then be stated as:

$$P'' = (1+f)\bar{P}, \tag{4-3a}$$

$$P' = (1-f)\bar{P}. \tag{4-3b}$$

Assume that supply and demand are, respectively, described by:

$$q^s = \alpha(1 \pm d) + \beta P \tag{4-4}$$

$$q^d = a(1 \pm h) + bP \tag{4-5}$$

where d and h are "shift variables." A positive value for d shifts supply to the right and a negative value shifts supply to the left. Similarly, a positive value for h shifts the demand curve up and a negative value shifts the demand curve down. It is assumed that supply and demand are defined on an annual basis.[13]

One of the cases contained in this model is described in Figure 4-6. It is assumed in this figure that $h = 0$; i.e., that demand is stable. Supply is assumed to be S_0 under average conditions ($d = 0$) and to shift between S_1 and S_2 with variations in, for example, the weather. When supply is at S_2, the buffer stock must purchase a quantity S* to maintain price at its lower bound P'.

Assume, that because of shifts in supply and/or demand, that the price floor $P' = (1 - f)\bar{P}$ must be defended. The total amount demanded by users plus purchases by the buffer stock (S*) must be equal supply for P' to be maintained. Therefore:

$$a(1 - h) + b(1 - f)\bar{P} + S^* = \alpha(1 + d) + \beta(1 - f)\bar{P}. \qquad (4\text{-}6a)$$

Expanding this expression:

$$\{a + b\bar{P}\} - ah - bf\bar{P} + S^* = \{\alpha + \beta\bar{P}\} + \alpha d - \beta f\bar{P}. \qquad (4\text{-}6b)$$

Each of the bracketed terms is equal to $\bar{q}$, so:

$$S^* = (ah + \alpha d) + f(b - \beta)\bar{P}. \qquad (4\text{-}7)$$

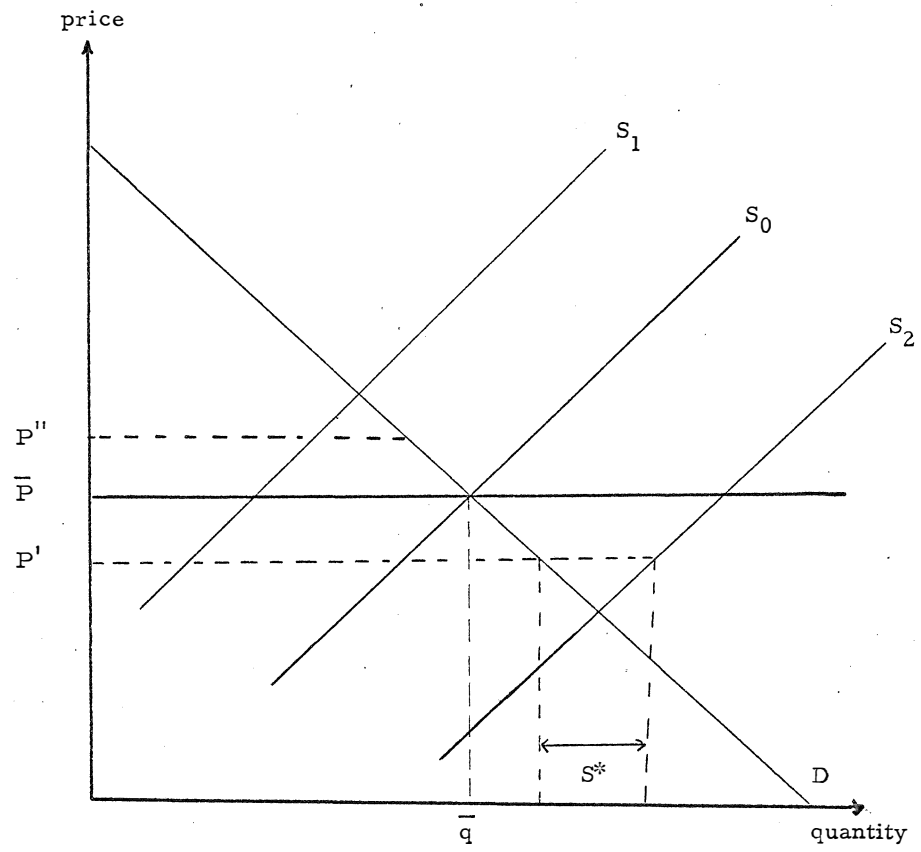
Dividing by $\bar{q}$ gives:

$$s^* = \frac{(ah + \alpha d)}{\bar{q}} + (\eta_d - \eta_s)f, \qquad (4\text{-}8)$$

where $s^* = S^*/\bar{q}$ is the maximum annual increment to the buffer stock as a fraction of base production, and η_d and η_s are, respectively, the elasticities of demand and supply. The value of the stock is $\bar{P}\ S^*$.

Figure 4-6

Maximum Size of a Buffer Stock When Only Supply Varies



Equation 4-8 was used to compute the values shown in Table 4-1. For the agricultural commodities (except rubber) it was assumed that $h = 0$ and that $d = 0.1$. For rubber and the metals, it was assumed that $d = 0$ and that $h = 0.1$. In all cases, it was assumed that $f = 0.1$.

The values used for η_s, η_d, $\bar{P}$ and $\bar{q}$ are those shown in Table 4-1. The elasticities of supply and demand, for cocoa, coffee, tea, wool, cotton, wheat, rice and sugar were computed using results contained in F. G. Adams, "An Econometric Model of the World Sugar Market," University of Pennsylvania, Department of Economics, Discussion Paper No. 330 (Oct., 1974) and F. G. Adams and J. Behrman, Seven Models of International Commodity Markets, unpublished manuscript prepared for the United Nations Conference on Trade and Development, December, 1974. The elasticities for copper were taken from F. Fisher, P. Cootner and M. Bailey, "An Econometric Model of the World Copper Industry," Bell Journal of Economics Vol. 3, No. 2 (Autumn, 1972), and the elasticities for bauxite from R. Pindyck, "Gains to Producers from Cartelization of Exhaustible Resources," Massachusetts Institute of Technology, Energy Laboratory World Oil Project, Working Paper MITEL 76-012WP (May, 1976). In the remaining cases (jute, sisal, rubber, tin and iron ore) the elasticities used were elicited from commodity experts in the Economic Analysis and Projections Department of the International Bank for Reconstruction and Development.

The values of α were estimated using:

$$\alpha = \bar{q}(1 - \eta_s) \tag{4-9a}$$

$$a = \bar{q}(1 - \eta_d) \tag{4-9b}$$

which hold given Equations 4-4 and 4-5.

All of the base prices and quantities, except those for bauxite, were taken from International Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975. The base price for bauxite was computed using value and production data from U.S. Department of the Interior, Bureau of Mines, Minerals Yearbook. Bauxite production was taken from American Metal Market, Metal Statistics, 1975.

Appendix 4-2

Benefits and Costs of Price Stabilization

The values shown in Table 4-3 were computed using results derived by Maissell.[14] Maissell assumes that supply and demand are, respectively, described by:

$$q^s = \alpha P + X, \tag{4-10}$$

$$q^d = -\beta P + Y, \tag{4-11}$$

where X and Y are shift factors. He then computes:

$$\bar{G}_s = \frac{(\alpha + 2\beta)\sigma XX - \alpha\sigma YY}{2(\alpha+\beta)^2}, \tag{4-12}$$

$$\bar{G}_c = \frac{(2\alpha + \beta)\sigma YY - \beta\sigma XX}{2(\alpha+\beta)^2}, \tag{4-13}$$

where $\bar{G}_s$ and $\bar{G}_c$ are respectively the expected gains from price stabilization to sellers and buyers, and σXX and σYY are, the variance of X and the variance of Y.

Multiplying and dividing by $(P/q)^2$, (4-12) and (4-13) can be rewritten as:

$$\bar{G}_s = \left[\frac{(\eta_s - 2\eta_d)\sigma XX - \eta_s\sigma YY}{2(\eta_s - \eta_d)^2}\right]\frac{P}{q}, \tag{4-14}$$

$$\bar{G}_c = \left[\frac{(2\eta_s - \eta_d)\sigma YY + \eta_d\sigma XX}{2(\eta_s - \eta_d)^2}\right]\frac{P}{q}, \tag{4-15}$$

where η_s and η_d are, respectively, the elasticity of supply and the elasticity of demand.

Equations 4-14 and 4-15 were used to compute the values presented in Table 4-3. The values employed for η_s, η_d, P and q were those given in Table 4-1. Crude estimates of σXX were obtained by assuming that supply is 10 percent above its base level, as measured by $\bar{q}$, one-third of the time, 10 percent below base one-third of the time and at its base level one-third of the time. Given these assumptions, $\sigma XX = (.66 \times 10^{-2})\bar{q}^{-2}$. A value for σYY was computed similarly.

Appendix 4-3

Organized Markets in Major Commodities

Commodity	Spot Market	Futures Market
Bananas	None	None
Cocoa	N.Y. Cocoa Exchange	N.Y. Cocoa Exchange Cocoa Exchange of London -- up to 18 months ahead
Coffee	N.Y. Coffee and Sugar Exchange	N.Y. Coffee and Sugar Exchange, London -- up to 13 months ahead
Cotton	N.Y. Cotton Exchange Liverpool, England	N.Y. Cotton Exchange -- up to 19 months ahead
Hard Fibres	New York-East African sisal -- Manila hemp	
Jute	In India -- Some organized Indian markets exist but have not been very successful -- Bangladesh	Indian markets
Meat (beef)	Chicago -- beef Omaha steers -- choice Sioux City steers -- choice	Chicago -- live cattle, feeder cattle
Rice	None	None

Appendix 4-3
(continued)

Organized Markets in Major Commodities

Commodity	Spot Market	Futures Market
Rubber	Singapore London New York Kuala Lumpur	Singapore London -- up to 2 years ahead New York -- up to 12 months ahead Kuala Lumpur
Sugar	N.Y. Coffee and Sugar Exchange: London Paris	N.Y. Coffee and Sugar Exchange London -- up to 18 months ahead
Tea	London Ceylon North India Java Formosa	None
Wheat	Chicago Kansas City Minneapolis	Chicago Kansas City Minneapolis Winnepeg
Wool	Sydney, Australia	Sydney, Australia London -- up to 18 months ahead
Copper	London New York	London -- 3 months forward New York -- up to 18 months forward
Tin		

FOOTNOTES TO CHAPTER 4

1. This statement is based on information presented in U.S. Treasury, Office of Raw Materials and Oceans Policy, op. cit. The success of the tin agreement in preventing large price declines seems to have been due primarily to the use of export quotas.

2. Ibid, p.74. The maximum size of the tin stock was estimated to be 384,000 metric tons with an acquisition cost of about $800 million.

3. The same series were used in computing the correlation coefficients as were used to compute the coefficients of variation given in Table 2-2.

4. Assume that the market is "slack" one period in three, "average" in the next and "tight" in the third period. Given this assumption and the values of Table 4-1, it is easy to show that the mean capital requirements for buffer stocks in all 15 commodities would be $5.2 billion or, if copper is excluded, $3.9 billion.

5. Ibid., p. 74 and p. 66. These are present values in 1967 dollars.

6. It is unlikely that more than 10 professionals would be required even for a large stock.

7. The underlying assumption is that the stock would buy as much at a price below the target price as it later sells at a price correspondingly above the target price. In the economic studies referred to earlier, trading costs for tin and copper buffer stocks were small for most rules. See U.S. Department of the Treasury, Office of Raw Materials and Oceans Policy, op. cit., pp. 65-75.

8. The relevant measure is not the buffer stocks borrowing rate but the opportunity cost of funds available to the buffer stock.

9. The cost estimates for the copper and tin buffer stocks were much less than this because only a 2 percent discount rate was assumed.

10. The rationale of this definition is basically as follows. Suppose that purchases are made on a monthly basis and that demand remains stable over serveral months. Assume that price is 100 in month 1 and 90 in month 2, and that quantity demanded is 1 unit in month 1 and 2 units in month 2. Expenditure is then 100 in month 1 and 180 in month 2. In month 2, the first unit is purchased for 90; but, from the

results of month 1 it is clear that the consumer places a value of at least 100 on the first unit bought. Hence, the total value placed on the 2 units must be at least 180 + 10 = 190, so consumers surplus is at least 10. If price were reduced in smaller increments, it would become clear that the change in consumers' surplus is an area such as c_1 in Figure 4-4.

11. That is, in terms of the notation of Appendix 4-1, it was assumed that $f = 0$.

12. Contingency stocks for wheat and rice, however, are another matter.

13. Given this representation, the buffer stock must be understood as defending an annual average price, so price can, for brief periods, be allowed to go below the lower limit or rise above the upper limit.

14. B. Maissell, "Price Stabilization and Welfare," Quarterly Journal of Economics 83 (1969): 285-298.

CHAPTER 5

ASPECTS OF RESTRICTIVE COMMODITY AGREEMENTS

The IP is frequently described as a means of speeding development by stabilizing commodity prices. The burden of Chapters 2-4 is that this elliptical characterization is at best uninformed. First, a reduction in the magnitude of period-to-period variations in commodity prices would have only a marginal effect on development, and in some cases would work to the disadvantage of sellers. Second, the mechanisms envisioned in the IP's commodity agreements are not those that would be used only to reduce fluctuations in price or export earnings. Finally, the cases in which pure buffer stocks are warranted in terms of their direct effects are so few, and the magnitude of the effects so small, as to make pure buffer stocks virtually irrelevant to any discussion that is focused on economic development.

These conclusions clear the way for an appraisal of the IP. The IP's commodity agreements are not designed simply to reduce fluctuations in price; their primary objective is to transfer income to the LDCs via higher commodity prices.

It would be tedious to consider the IP in standard economic terms because the answers are obvious. To the extent that the IP was successful in increasing commodity prices, it would not be in the economic interests of the DCs and the IP would be a grossly

inefficient way of aiding the LDCs' development.[1] The IP could, then, be dismissed out of hand by the DCs but for the contention that it would promote international cooperation.

This is a difficult proposition. It would clearly be futile to forecast in detail how the IP would effect international affairs; apart from the myriad systematic economic and political facts that are relevant, the course of the IP would be subject to accidents of history and the vagaries of personality. But the major problems that the IP would face and its means for dealing with those problems can be identified and, on that basis, it is possible to make an assessment of the IP's impact.

The analysis can be anchored in the fact that the IP would be built around restrictive commodity agreements. The potential of the IP for increasing the LDCs' export earnings, and the problems encountered would be those of restrictive commodity agreements. These matters are accessible through facts about the structure and history of the commodity markets. Analysis of restrictive commodity agreements should not, however, be confused with analysis of the IP itself. The IP's commodity agreements are unlike most of those that have been tried in the past and the IP as a complete organization is without historical parallel. The properties of restrictive commodity agreements, which is the subject of this chapter, should instead be understood as posing the problems which the IP is designed to solve.

POTENTIAL EFFECTS OF RESTRICTIVE COMMODITY AGREEMENTS

The success of restrictive commodity agreements is not assured. The organization could collapse or be reduced to impotence by internal conflicts. Even if these problems are laid aside, the increase in earnings which a restrictive commodity agreement could generate is limited by the size of the markets and the characteristics of demand and production costs.

Table 5-1 presents very rough estimates of the effects of price increases for sixteen commodities. These estimates assume that the demand for each of the commodities was at its 1971 level. The estimates take account of the fact that price increases reduce consumption and incorporate a crude attempt to take account of the effect of reductions in the quantity produced on the costs of production.[2] Appendix 5-1 presents the formulas used in computing the estimates. Given the 1971 level of demand, and the other assumptions made, a 20 percent increase in the price of each of the sixteen commodities would generate an additional revenue of $17.6 billion and a 100 percent price increase would increase revenues by approximately $88 billion. If wheat and rice are excluded, the corresponding figures are $10 billion and $50 billion.

The estimates in Table 5-1 use short-run elasticities of demand and, for that reason, must be regarded as maximal. A price increase invariably induces some substitution but the substitution may require two or three years to accomplish.[3] Hence, while a price hike may initially yield a large increase in revenue, the increase will tend to diminish over time. In some cases, this effect would be large.[4]

Table 5-1

Estimated Effects of Price Increases on Revenue and Profit
($ Million)

	20 Percent Increase in Price		100 Percent increase in Price	
	Increase In Revenue	Increase In Profit	Increase In Revenue	Increase In Profit
Cocoa	390	570	1,950	2,870
Coffee	520	710	2,590	3,550
Tea	140	170	720	860
Wool	2,300	3,020	11,480	15,110
Cotton	870	1,190	4,350	5,960
Wheat	3,760	4,700	18,820	23,520
Rice	3,860	4,110	19,320	20,550
Sugar	3,050	3,630	15,230	18,100
Bananas	33	132	165	660
Jute	24	47	118	236
Sisal	25	36	126	180
Beef	9	36	45	179
Rubber	174	290	869	1,448
Copper	1,525	1,774	7,627	8,868
Tin	188	204	940	1,022
Iron Ore	556	618	2,782	3,091
Bauxite	187	191	936	956

Sources: See Appendix 5-1.

The LDCs would not obtain all of any increase in revenue and would pay part of the increased prices. These two effects are described by the estimates presented in Table 5-2. The first column of this table shows the fraction of the commodity exported by the LDCs. It is reasonable to assume that if the LDCs export, say, 90 percent of a commodity, they would obtain 90 percent of any increase in revenue due to higher prices. The figures in columns (2) and (3) use this assumption and the estimates given in Table 5-1, to compute the revenue flows to the LDCs from higher prices for the sixteen commodities. Columns (3)-(6) present estimates of the increased costs to the LDCs of higher commodity prices and the final columns show the net revenue flows to the LDCs. Increases in the prices of wheat and rice would impose very heavy costs on the LDCs and, for that reason, presumably would not be included in an IP.[5] If these two commodities are excluded, the net increase in revenue to the LDCs for 20 percent and 100 percent increases in the prices of the fourteen remaining commodities would be $4.1 billion and $20.5 billion respectively.

These overall figures mask the fact that some of the LDCs would be net losers if commodity prices were increased. The principal gainers would be the major producers of cocoa, coffee, cotton, copper and sugar. Approximately thirty of the LDCs would be in this group. The losers would be nations who export relatively low value commodities and who import substantial quantities of other commodities -- especially cotton, copper, sugar and wool. The data on commodity imports required to identify these nations is not available, but quantitative

Table 5-2

Net Revenue Flows to LDCs Through Increased Commodity Prices
($ million)

	Percent of Commodity Exported by LDCs	Total Increase in Revenue to LDCs -- Price Increase of 20%	100%	Percent of Commodity Imported by LDCs	Increase in Cost to LDCs -- Price Increase of 20%	100%	Net Revenue to LDCs -- Price Increase of 20%	100%
cocoa	99.2	386.5	1,932.7	3.0	11.7	58.4	374.9	1,874.3
coffee	96.8	501.4	2,507.2	4.1	21.2	106.2	480.2	2,401.0
tea	82.8	119.4	597.2	28.6	41.3	206.2	78.2	390.9
wool	11.9	273.3	1,366.4	9.0	206.7	1,033.4	66.6	333.0
cotton	57.9	503.6	2,518.1	16.7	145.3	726.3	358.4	1,791.8
wheat	3.6	135.5	677.4	45.1	1,697.4	8,486.9	-1,561.9	-7,809.4
rice	35.8	1,383.1	6,915.1	71.5	2,762.2	13,810.9	-1,379.2	-6,895.8
sugar	69.7	2,123.3	10,616.4	22.	679.3	3,396.6	1,444.0	7,219.7
bananas	93.3	30.8	154.0	6.4	2.1	10.6	28.7	143.4
jute	95.6	22.5	112.7	32.8	7.7	38.7	14.8	74.0
sisal	97.7	24.6	122.8	5.2	1.3	6.5	23.3	116.3
beef	30.5	2.7	13.6	5.9	0.5	2.6	2.2	11.0
rubber	97.7	169.8	849.0	9.6	16.7	83.4	153.1	765.5
copper	54.5	831.3	4,156.5	7.2	109.8	549.1	721.5	3,607.4
tin	85.5	160.8	803.8	5.8	10.9	54.5	149.9	749.3
iron	37.9	210.9	1,054.3	0.8	4.5	22.3	206.4	1,032.0

Sources: U.N. Food and Agriculture Organization, Trade Yearbook, 1974; and International Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975.

information provides some help. India, the nations just below the Sahara, and many of the nations in northern Africa and South East Asia export relatively low value crops; and there is some indication that they tend to be importers of agricultural products. These nations, which are the majority of the poorest of the LDCs, would probably be net losers under a system of restrictive commodity agreements.

The information in Table 5-3 provides a way of putting the estimates of Table 5-2 in perspective. In 1972, the total flow of capital to the LDCs was $20.2 billion. Of this, $8.4 billion was private investment, while the remaining $11.8 billion was bilateral and multilateral assistance. Then, if an IP doubled the prices of the commodities in Table 5-2, except wheat and rice, the additional revenue would be about 175 percent of the level of development assistance. To the extent that the IP would act as a substitute for foreign aid, the net increase in funds available to the LDCs would be smaller.

It may also be relevant to compare the effects of a successful IP with those of OPEC. In each of 1974, 1975 and 1976, the higher prices enforced by OPEC increased the oil producers' revenues by approximately $80 billion, the bulk of which occurred to Middle Eastern nations with a total population of less than 100 million. The increased revenues of an IP would be much smaller and would be spread over a much larger population base.

The conclusion of this discussion is that a successful IP would generate significant increases in revenue to the LDCs, but

Table 5-3

Flow of Financial Resources From Developed Countries and Multilateral Agencies to LDCs, 1972
($ billion)

Bilateral Assistance		6.8
grants and grant-like flows	4.4	
loans at concessional terms	2.4	
Multilateral Assistance		4.0
International Bank for Reconstruction and Development	1.9	
Other	2.1	
Grants by Voluntary Agencies		1.0
Private Flows		8.4
Total		20.2

Source: OECD, The U.S. and the Developing World, Tables D-2 and D-7.

that these increases would not be extremely large relative to development assistance or the additional revenues generated by increases in the price of oil. This is an important point which will be discussed at greater length in the following chapter.

THE HISTORICAL RECORD[6]

The estimates that have been presented assume that restrictive commodity agreements would be successful. As has been mentioned several times, this assumption is questionable. If nothing else, a glance at the historical record is sufficient to create doubts about the prospects for restrictive agreements.

Figure 5-1 shows the periods during which the major international restrictive agreements in commodities operated. This figure excludes all non-governmental and unilateral restrictive schemes, of which there were many, informal arrangements under the U.N. Food and Agriculture Organization and some very specialized agreements.

At the start of World War II, there were agreements covering five commodities -- tin, rubber, copper, sugar and tea. All of these agreements were among governments, but only suppliers were included.[7] In each case, export quotas were the principal mechanism of the agreement; in fact, the agreements basically set up a means for establishing, adjusting and enforcing export quotas.[8] The export quotas were usually tied in some way to a notion of a desired price.[9] Only the tin agreement made provision for a buffer stock, and that operated only sporadically.

Figure 5-1
Major Commodity Agreements

Figure 5-1
(Continued)

* Provisions of the agreement suspended due to wartime conditions and controls.

** No economic provisions.

Sources: J. Rowe, Primary Commodities in International Trade (Cambridge University Press, 1965); G. Stocking and M. Watkins, Cartels in Action (The Twentieth Century Fund, 1947); J. Davis, "Experience Under Intergovernmental Commodity Agreements, 1902-1945," Journal of Political Economy 54 (June, 1946): 193-220; U.S. Senate, Committee on Finance, International Commodity Agreements (Washington: GPO, 1975).

The agreements in tin, rubber, copper, sugar and tea effectively ended with the imposition of wartime controls. Some of these agreements -- especially the International Rubber Regulation Agreement -- might have collapsed in any event, but this is not entirely clear. The clear failures in the period through the end of World War II are the Stevenson Plan, the Chadbourne Plan,[10] the International Wheat Agreement (IWA) and the Inter-American Coffee Agreement (IACA).

The IWA and the IACA were out of the mainstream of prewar commodity agreements. While both are mentioned below, they will be laid aside for the moment.

The Stevenson Plan covered rubber production in three British dependencies -- Ceylon, The Federated Malay States and The Straits Settlements. When the plan was inaugurated in 1922, these British colonies accounted for about 70 percent of the world rubber supply.[11] The Stevenson Plan relied on export restrictions to increase prices. Rubber prices were in fact increased by the imposition of export restrictions, but therein lay the seeds of the plan's failure. The higher price for natural rubber stimulated the development of synthetic rubber and increased use of reclaimed rubber. Furthermore, production not covered by the agreement, especially in the Netherlands East Indies, increased dramatically. In 1922, the Dutch accounted for 23.2 percent of world production. By 1927 -- the year before the Stevenson Plan was abandoned -- the Dutch share had increased to 37.7 percent and the British share had fallen to 54.1 percent.[12]

The Chadbourne Plan, which began in May 1931, collapsed four years later for similar reasons. The principal aim of the Chadbourne Plan was to work off large stocks of sugar, which had accumulated, without depressing price. The plan included a schedule for disposal of the stock and bound the participants -- Cuba, Java, Peru, and the major European sugar producers -- to export quotas. The Chadbourne Plan did not succeed in increasing the price of sugar. While members of the Chadbourne Plan reduced their production by about six million tons, increased production from non-members made up about two-thirds of the reduction.[13] This increase was not a response to higher prices but was instead the ". . . result of the intensified programs of numerous consuming countries for fostering domestic production . . ."[14] Nevertheless, the increase in sugar production by non-members limited the profitability of the Chadbourne Plan, and it was not renewed when the agreement expired in 1935.

In addition to the Stevenson and Chadbourne Plans, the 1920's provided several examples of regulatory schemes undertaken by individual governments or groups of producers. The International Tin Control, for example, was preceded by the Tin Producers Association, and the International Copper Control was preceded by the Copper Exporters Association and Copper Exporters, Incorporated. None of these schemes were very successful and none lasted for more than a few years.

The fate of unilateral government actions is illustrated by Brazil's valorization schemes. Brazil's efforts to influence the

price of coffee by stockpiling go back to 1907. The last of these schemes began in 1922, when Brazil established the Coffee Defense Institute. The Coffee Defense Institute was conceived along the lines of an ever normal grainery. The Institute advanced producers payment when their crops were delivered to government warehouses. Suppliers were paid a preset base price, which should have been set at the average level of price over good and bad crop years. But, at least after 1926, the base price was set at too high a level, so the valorization scheme became a price support program. This required accumulating stocks. The Coffee Defense Institute was able to handle the bumper harvest of 1927-1928. But, contrary to the usual cycle, this was followed by another large crop in 1929. The Institute was unable to obtain sufficient financing and was forced to stop buying. Coffee prices then declined by approximately 50 percent.[15]

The International Rubber Regulation Agreement of 1934 was descended from the Stevenson Plan in that it responded to the Stevenson Plan's failure. The Chadbourne Plan was also, in this respect, the predecessor of the International Sugar Agreement of 1937. There is a more general sense in which the commodity agreements of the late 1930's were successors to earlier failures. Commentators on this period state that past experience had taught two and perhaps three lessons. First, to have a chance of success an agreement must include very nearly all suppliers. Second, unilateral schemes, or agreements among private firms, did not work, which implies that restrictive arrangements must be based on agreements among governments.

Apart from any role that political means may have in gaining the necessary coverage for an agreement, governments have the means of enforcing export quotas. A third lesson was that to be successful, an agreement must behave in a moderate way -- in particular, it must not attempt to increase price above the competitive level.

The five agreements that were in force at the start of World War II generally honored these lessons, and they at least avoided collapse. It is not so clear that they achieved their economic aims. If OPEC's quadrupling of the price of oil is taken as a standard, then none of these agreements was a success; in fact, by this stringent test, all previous commodity agreements were dismal failures. But there is a consensus that, in more limited terms, the commodity agreements of the mid-to-late 1930's were reasonably successful.

The nature and extent of their success reflect the special circumstances of the 1930's. From 1930 to the start of World War II the commodity markets were, with scattered exceptions and interruptions, severely depressed. In these circumstances, commodity prices would fall to the level of average out of pocket costs. Some suppliers would be driven from the market more or less immediately, and all producers would fail to cover capital costs. This situation would persist until, by the elimination of suppliers, the size of the industry had been accommodated to the drastically reduced level of demand.

The five commodity agreements that persisted to World War II were a response to this situation. Their means were monopolistic, as was their aim -- to increase prices. However, it seems that these

agreements only attempted to increase price to the long run competitive level -- that is, to the long run average cost of efficient operations.[16] The incentive for overshipping would remain but, given that price was not increased above long run average cost, the viability of the agreement would not be challenged by new entry. By moderate behavior, then, the commodity agreements of the 1930's avoided a principal cause of the failure of earlier restrictive schemes. Their major purpose was apparently to preserve existing suppliers pending an eventual recovery of demand, and in this respect they were reasonably successful.[17]

The postwar commodity agreements differ from those of the 1930's in that buyers were more often included. The Latin American Coffee Agreement (LACA), the International Tea Agreement, and Conseil International des Pays Exportateurs du Cuivri (CIPEC) include only sellers. However, the other postwar commodity agreements shown in Figure 5-1 include both buyers and sellers.

The International Tin Agreement, like the prewar International Tin Control, includes a small buffer stock but relies primarily on export quotas. The International Cocoa Agreement also made provision for a buffer stock, as well as the usual mechanism for export controls. The LACA, the subsequent International Coffee Agreement, the International Sugar Agreements and the International Tea Agreement all were essentially agreements on export quotas. The International Wheat Agreements (IWA) made provision for purchases or sales at guaranteed prices, when the market price rose above or fell below preestablished values.

The International Cocoa Agreement has yet to be tested because, for reasons unconnected with the agreement, the price of cocoa has been exceptionally high. CIPEC was formed without economic provisions; it is an example of a failure to reach an agreement rather than of the failure of an agreement. But of the remaining cases, only the International Tin Agreement has not collapsed.

The International Tea Agreement that operated during 1950-1955 was a very mild, or perhaps desultory, restrictive scheme. The agreement was not brought down by economic forces, but apparently was not renewed because it accomplished very little.[18] In 1962, after four years of operation, the LACA was on the brink of the fate of Brazil's earlier valorization schemes. The price of coffee had declined over the life of the agreement and in 1962 Brazil's carry-over stock exceeded total world coffee exports of the preceeding year.[19] This situation was retrived when the U.S. indicated its willingness to join a coffee agreement. The LACA was replaced in 1962 by an International Coffee Agreement.

The International Coffee Agreement, two International Sugar Agreements (ISA) and the IWA were brought down by disputes among participants. The issue in the failure of the ISA in 1961 was Cuba's insistence that her quota be increased to include sales made under contracts with Communist nations. This would have amounted to a tripling of Cuba's quota, which was unacceptable to other suppliers.[20] The failures of a second ISA, the IWA and the International Coffee Agreement all involved disputes between buyers

and sellers over price ranges and/or export quotas. The Inter-American Coffee Agreement was also, apparently, not extended when it expired in 1946 because of a dispute between suppliers and the U.S. over prices.

Although failures by the standards of OPEC, some of the postwar agreements had brief success in increasing prices. For example:

> The 1964 price jump (to nearly 50¢) must be considered the direct result of the coffee agreement, with only minor, if any, assistance from the weather.[21]

The International Tin Agreement, to give another example, enjoyed its customary success in limiting declines in price. There were not, however, any dramatic successes.

If the postwar experience contains any lesson, it is that commodity agreements are contentious affairs. Of the nine postwar agreements, five -- counting CIPEC[22] -- failed because of disagreements among participants. The exceptions are the International Tea Agreement and the LACA, which failed for other reasons; the International Cocoa Agreement, which has yet to be tested; and the International Tin Agreement, which must be counted a success.

The historical record as a whole conveys a mixed impression. On the one hand, the commodity agreements of the 1930's worked reasonably well. On the other hand, the restrictive schemes of the 1920's and those of the postwar period were not successful. The resolution of this contradiction perhaps lies in the special circumstances of the 1930's and the relatively modest aims of the commodity agreements of that period. It seems reasonable to conclude

that attempts to use international agreements to increase price above the competitive level have had only transitory success.

STRUCTURAL DETERMINANTS OF INSTABILITY

This conclusion does not, however, carry any strong implications for the IP, because the IP would be significantly different from anything attempted in the past. The IP should be viewed as a response to the failures of postwar commodity agreements in the same way the agreements of the 1930's responded to earlier failures. The historical record does point to the problems and conflicts associated with restrictive commodity agreements. These problems are neither historical accidents nor the result of ineptitude, but have their roots in the structure of the commodity markets.

The IP's commodity agreements would include both buyers and sellers and so could be threatened by disputes -- over price, purchase and sales policies of the buffer stocks, export quotas -- with buyers on one side and sellers on the other. There is a surrealistic aspect to this possibility: why would buyers ever join an organization designed to increase prices? The question can perhaps be answered and it is possible to indicate how buyers' actions would be constrained by acceptance of the IP. But examination of the role that buyers would play is postponed to the following chapter. The remainder of this chapter is concerned with the behavior of suppliers.

Perhaps because international discussions of commodities problems have cast the DCs and the LDCs as opponents, there is a tendency to treat suppliers as a unified bloc. Doing so brushes aside the critical problems that afflict restrictive arrangements of all sorts. Opposing forces work on restrictive arrangements. The suppliers in an industry have an incentive -- increased profit -- to cooperate in restricting supply and increasing price. But price increases set up forces that tend to undermine the arrangement.

The continuing short-term problem of any restrictive arrangement is limiting output to the level consistent with the "desired" price. Historical experience makes it obvious -- if it is not simply obvious -- that this requires an agreement which covers substantially all of supply. Given that this condition is satisfied, the problem is to ensure that members abide by their assigned export quotas. The problem exists because any supplier can obtain an increased profit by overshipping, so long as overshipping does not become general. Given that overshipping occurs, and as a consequence price declines, sellers that stay within their quotas will typically be left worse off then they would be in the absence of the agreement. The result of significant overshipping is, therefore, likely to be the collapse of the agreement.

The forces that operate are such that restrictive arrangements can be self-policing in the sense that suppliers restrain themselves from overshipping. Whether a restrictive agreement would have this feature depends primarily on the degree to which supply is concentrated. Given that no small group of sellers retains a

preponderant share of the market, significant overshipping is more likely to occur, and the problem becomes more intractable as the number of suppliers increases.

This proposition is best viewed as a statement of observed fact, but it can be rationalized to an extent. The explanation turns on sellers' perceptions of the effects of their actions on the market and other sellers. Consider first an industry with only two sellers, A and B, of roughly equal size. Suppose that A cuts price, which will have a large effect on B's sales. B can be expected to respond by matching or undercutting A's price, which would leave both sellers worse off. In an industry with only two sellers, this logic, and hence the need for cooperation, is easy to grasp. But, suppose there are twenty-five sellers of roughly equal size in the industry. In this case, a price cut by any one seller will not have a large impact on the others. Furthermore, cheating becomes more difficult to detect as the number of sellers increases. The danger of retaliation then decreases and the incentive to cheat accordingly increases, as the number of sellers increases.

How "few" sellers is "few enough" for a restrictive agreement to be self-policing is a matter of informed judgment. Most students of industrial behavior would agree that collusive arrangements tend to be stable in industries dominated by three or four sellers and many would extend this to industries with eight to ten major suppliers. These judgments, however, primarily reflect domestic experience, and international restrictive arrangements would probably be more prone to instability with any given number

of sellers.[23] Unfortunately, it is not clear much more stringent a test should be applied in judging international agreements.

Table 5-4 shows the share of the four largest suppliers among the LDCs in each of seventeen commodities. The four largest suppliers hold at least 75 percent of the export markets in six of these commodities -- cocoa, jute, rubber, sisal, tea and tin. The figures for jute, sisal and rubber, however, are misleading as each of these commodities faces strong competition from synthetic products. If the markets were, as they should be, defined as including the synthetic substitutes, concentration in rubber, jute and sisal would be low. But concentration in the export markets for cocoa, tea and tin is high enough to suggest that suppliers would behave cooperatively. The extent of concentration in the export markets for bananas, bauxite, coffee and copper[24] falls into an ambiguous range. Concentration in the export markets for the remaining seven commodities is low. It is reasonable to assume that restrictive arrangements for these commodities, and for jute, sisal and rubber, would require a means for enforcing production controls or export quotas.

Overshipping was a major cause of the failure of the first International Wheat Agreement. Argentina had a bumper wheat crop in 1933-1934 and exceeded its quota to a noticeable extent. It was apparently not the overshipping as such that brought down the IWA, but rather a related dispute over limitations on production.[25] Overshipping was also a major problem for the International Coffee Agreement in the mid-1960's[26] and, forty years earlier for the

Table 5-4

Export Market Shares of the Four Largest LDC Producers, Average, 1970-1972
(percent)

bananas	57.4
bauxite	59.9
beef	23.9
cocoa	74.5
coffee	54.4
copper	47.4
cotton	30.8
iron ore	25.9
jute	94.2
rice	26.2
rubber	87.6
sisal	80.7
sugar	42.5
tea	66.3
tin	75.3
wheat	3.3
wool	9.4

Source: Internation Bank for Reconstruction and Development, Commodity Trade and Price Trends, 1975.

Stevenson Plan. The difficulty in the last of these cases was not that participating governments cheated, but rather that individual producers "smuggled" rubber out of the country.[27] These cases are simply examples. Restrictive agreements block ". . . exchange between consenting adults . . ."[28] and for that reason encounter troubles, for precisely the same reasons that Prohibition encountered troubles. This has been true of virtually all restrictive agreements in the past and must be expected under the sort of agreements that the IP would create.

A second continuing problem of restrictive commodity agreements would be the negotiation of price and, to a much greater extent, market shares. The most intractable problems are likely to be posed by relatively recent, low cost entrants. Such a supplier would probably begin with a relatively small share of the market, but insist on a larger share and threaten to withdraw if his demands were not satisfied. The threat could be very creditable as a low cost supplier might be able to do better outside the agreement than he could by accepting a relatively small market share within the agreement. If demand is growing, the other suppliers may be able to satisfy the demands of the low cost producer without reducing their output. But if demand is not growing, the other producers can meet the low cost supplier's demand for an increased market share only by "moving over."

The profits of the suppliers as a group would be larger with the agreement than without it, so there is always some assignment of market shares that leaves all suppliers better off than they would

be otherwise. But experience indicates that such a solution is not always found and, if it is not, the agreement collapses.

The record of tin agreements provides an instructive example of the successful resolution of a dispute over market shares. The tin agreement, concluded in 1933, was first extended for one year and then renegotiated in 1936. These negotiations encountered serious difficulties when Thailand and what was then the Belgium Congo insisted on larger market shares. At one point, Britain and Portugal withdrew from the negotiations. The nature of the solution is indicated by the data in Table 5-5. The large producers -- especially British Malaya and the Netherlands East Indies -- gave up part of their shares of the market in favor of Thailand and the Belgium Congo.

OPEC provides another example of this sort of behavior. Saudi Arabia's willingness to reduce its market share to accommodate other producers appears to have been an important factor in OPEC's success. The maintenance of the International Coffee Agreements from 1962 to 1970 was also due in part to Brazil's willingness to move over in favor of new African producers.[29]

This pattern has not held in all cases. As was mentioned earlier, the first postwar International Sugar Agreement ended in 1961 with a dispute over market shares. While this seems to be the only agreement that collapsed because of a dispute over market shares, it is not the only pertinent example. The negotiations that lead to CIPEC were an attempt to form a restrictive agreement. However, Chile, Zäire, and Zambia were reportedly unwilling to accept

Table 5-5

Standard Tonnages Under the Second and Third International Tin Control Agreements (Percent of Total)

Country	Second Agreement	Third Agreement
British Malaya	38.1	36.0
Netherlands East Indies	19.2	18.2
Thailand	7.0	9.0
French Indo-China	1.7	1.5
Belgium Congo	3.6	6.6
Nigeria	5.8	5.4
Bolivia	24.6	23.3
Total	100.0	100.0

Source: K. Knorr, Tin Under Control (Stanford, 1949), p. 249.

Peru's demand for a larger market share and CIPEC remains without economic provisions. The failure of the cocoa producers to, twice, reach an agreement during the mid-1960's also count as examples.

The characteristic that seems to distinguish the successes from the failures is the share of the one or two largest suppliers. In the cases where agreement was not reached, there was no dominant firm. In the cases where agreement was reached, one or two nations accounted for upwards of one-third of total supply. It is not clear why this rule should hold, but, if true, it is not favorable to the IP. There are a few commodities with dominant suppliers -- tin, coffee, bauxite -- but this is not typical. If the IP were created, several disagreements over market shares could be expected. And the longer the agreements persist, the worse these difficulties would be.

Entry is the long run counterpart of price cutting and overshipping. A price above the long run average cost of efficient operations is an inducement to entry. Unless entry is limited by natural barriers, or somehow controlled by existing suppliers, price must eventually fall to the competitive level.

Relatively large capital costs are an impediment to entry into the metals industries. For example, the capital costs of developing a copper mine of moderate size are upwards of $250 million, and the capital costs of an integrated operation are about twice that amount. Entry into metals mining, furthermore, requires finding an ore body that can be profitably exploited. Such discoveries are made from time to time, but they are not routine occurrences.

While detailed study might suggest otherwise, there is a presumption that entry into the metals industries is difficult. This does not mean that entry is impossible. A significant price increase would spur efforts to find new deposits and hasten the development of deposits already known, and over the course of a decade these forces probably would call forth a few new suppliers. However, the prices of metals could be raised considerably above the competitive level without attracting a rush of entrants.

This is not the case for most agricultural products. It is true that some agricultural commodities require relatively specialized conditions for their cultivation, but even within these limitations, the scope for entry is substantial. For most agricultural products, then, significant price increases would attract entrants within a year or two. Cocoa, coffee, rubber and tea are exceptions to this rule. In these cases, the trees (or bushes) require several years to mature and begin yielding regular crops. Hence, while price increases would encourage additional plantings, the effects would not be felt for several years.

In summary, the structural conditions that favor restrictive agreements are: high concentration and the absence of competition from close substitutes; the presence of one or two dominant suppliers; and high barriers to entry. Tin meets these tests and copper and bauxite come close, although concentration in the copper industry is on the low side and there are substitutes for bauxite. The least favorable conditions for restrictive commodity agreements are: low concentration or competition from close substitutes; the absence of

a dominant supplier; and low barriers to entry. These conditions, and, especially, low barriers to entry, are characteristic of agricultural commodities.

CONCLUDING COMMENTS

This chapter has been primarily concerned with describing the problems that would be faced by restrictive agreements. In order of increasing difficulty these are: overshipping; disputes among participants -- in particular disputes among suppliers over market shares; and entry. The structural conditions of the commodity markets are such that these problems can be expected to be severe.

Appendix 5-1

The Effects of a Price Increase on Production, Revenue and Profit

This appendix develops the formulas used to compute the estimates presented in Table 5-1. Production and price are denoted by q and P respectively. Revenue is denoted by R and the elasticity of demand by η.

From the definition of elasticity of demand,

$$\Delta q \doteq \eta q h \qquad (5\text{-}1)$$

where $h = \Delta P/P$. Incremental revenue is given by:

$$\Delta R \doteq (1 + 1/\eta) P \Delta q. \qquad (5\text{-}2)$$

Substituting the expression on the right hand side of (5-1) for Δq and simplifying gives:

$$\Delta R \doteq (1 + \eta) h r. \qquad (5\text{-}3)$$

The change in profit is, by definition:

$$\Delta \Pi \doteq \Delta R - \Delta C, \qquad (5\text{-}4)$$

where C is total cost. Assume that long-run average cost is a constant $\bar{C}$ and that the initial price $\bar{P}$ is equal to $\bar{C}$. Then:

$$\Delta C = \bar{C} \Delta q = \bar{P} \Delta q \doteq \eta h R, \qquad (5\text{-}5)$$

again using (5-1). Substituting equations (5-3) and (5-5) into (5-4):

$$\Delta \Pi \doteq h R. \qquad (5\text{-}6)$$

Equations (5-3), and (5-6) were used to compute the values shown in Table 5-1. The elasticities used are given in Table 4-1 (p. 96).

FOOTNOTES TO CHAPTER 5

1. See ch. 1, pp. 16-18.

2. The increase in profit exceeds the increase in revenue because the price increase leads to a reduction in the quantity supplied and hence a reduction in the costs of production.

3. This will be the case whenever the substitution of one material for another requires significant changes in fixed plant and equipment or product design. For example, substitution of aluminum for copper in most applications requires investment in new equipment. The fact that tastes change slowly can be a source of delay in the substitution process for food items such as coffee and tea.

4. For example, the long run elasticity of demand for copper is more than twice the short run elasticity. See F. Fisher, P. Cootner and M. Bailey, "An Econometric Model of the World Copper Industry," Bell Journal of Economics 3 (Autumn, 1972): 568-609. Some commodities -- especially sisal and jute -- face strong competition from synthetic products. A significant increase in the prices of these commodities is virtually precluded by competition.

5. Contingency stocks, however, may be another matter. In his speech before the U.N. General Assembly In September 1975, Secretary of State Kissinger proposed the creation of contingency stocks for wheat and other major food grains.

6. I was aided in writing this section by a review of the literature prepared by Robert Stillman.

7. The International Rubber Regulation included three non-voting observers from rubber manufacturers.

8. Provisions on the size of stocks that were permissible and more direct limitations on production were not atypical.

9. The International Tea Agreement denied having any price objectives. See Davis, op. cit., p. 201. This apparently meant that export quotas were set in terms of long run considerations rather than current prices.

10. The Chadbourne Plan was an agreement among sugar producers associations, but the governments of the nations concerned agreed to pass the legislation necessary to enforce export quotas and, with one unimportant exception, did so. See G. Stocking and M. Watkins, Cartels in Action (New York: The Twentieth Century Fund, 1947), p. 66.

11. Ibid, p. 66.

12. Ibid, p. 72. The British share increased to 66 percent in 1929. Stocking and Watson also list "defection and smuggling" as an important reason for the failure of the Stevenson Plan.

13. J. Rowe, Primary Commodities in International Trade (Cambridge University Press, 1965), pp. 146-147.

14. Stocking and Watkins, op. cit., p. 41.

15. Rowe, op. cit., pp. 133-134.

16. This is an interpretation of statements made by Davis, op. cit. and, especially, Rowe, op. cit.

17. One question that might be asked is whether efforts to preserve capacity are warranted on grounds of efficiency. The affirmative case presumably would be that destruction of capacity "today" and its recreation after only a few years involves a waste of resources. Some economists -- Rowe, op. cit., for example -- accept this argument, but most do not. However, it seems that the possibility that actions to preserve capacity would be warranted on grounds of efficiency has never been subjected to close analysis.

18. The prewar International Tea Agreement was also only very mildly restrictive and was judged by its participants to be only moderately successful. See Davis, op. cit., pp. 199-202. It may also be relevant to note that the tea markets are much less unstable than are other commodity markets. See Rowe, op. cit., pp. 148-149.

19. Rowe, op. cit., p. 179.

20. Rowe, op. cit. p. 177.

21. A. Law, International Commodity Agreements (Lexington Books, 1975), p. 44.

22. This is fair, as the intent of the negotiations that produced CIPEC was a restrictive scheme. Two unsuccessful attempts to create cocoa agreements during the mid-1960's might also be added to this list.

23. This would be true in part simply because of the greater difficulty of communication across national boundaries. The more important reason has to do with the fact that international arrangements would rely on restrictions on supply to maintain price rather than on direct agreement on price. Overshipping is more difficult to detect than price cutting and hence can be expected to be more prevalent.

24. It is worth noting that DCs -- especially the U.S., Canada and Australia -- are both major producers and consumers of copper, which limits the relevance of concentration in the export market.

25. Davis, op. cit., p. 205.

26. I. Kravis, "International Agreements to Promote Aid and Efficiency: The Case of Coffee," Canadian Journal of Economics 1 (May, 1968): 295-317, especially p. 305.

27. Stocking and Watkins, op. cit., p. 74-76.

28. The phrase is borrowed from R. Nozick, Anarchy, State and Utopia (Basic Books, 1974).

29. Kravis, op. cit., p. 298.

CHAPTER 6

POLITICAL ECONOMY OF THE INTEGRATED PROGRAM

Restrictive commodity agreements are afflicted by a predictable set of problems which tend to undermine the agreements. Collapse of such arrangements is not necessarily inevitable. But, to be successful, restrictive commodity agreements, and by extension the IP, must have the means for dealing effectively with overshipping, disputes among participants and entry.

The IP would be more than a collection of commodity agreements. It is intended to be a system of commodity agreements related by a Common Fund, which in one way or another would serve as an umbrella organization. This hints at the crucial fact that the IP as a whole is a means for mobilizing and focussing political forces towards economic ends.

There are several political aspects to the IP. First, the IP has served the LDCs as a political platform; it expresses generally shared aspirations and principles and, in this way, provides a rallying point for the LDCs. Second, the IP responds, with seeming grace, to a problem posed by some existing presumptions of international politics. On the one hand, the DCs have, on many occasions, committed themselves to assisting the economic growth of the LDCs. On the other hand, the DCs have recognized that foreign aid has not succeeded. While these points do not in themselves argue for the IP, they pose

a problem to which the IP is arguably a solution. Third, associated with the IP is a strategy for gaining acceptance of the program. The IP includes sufficiently many commodities to hint at benefits for all suppliers and suggest a threat to all buyers. Furthermore, simultaneous negotiation of all the various elements of the IP tends to focus the power of the LDCs as a bloc.[1]

These points are straightforward. The more subtle and complicated political aspects of the IP lie within its structure. In particular, the IP contains a political strategy for stabilizing restrictive commodity agreements. Much hangs on this point. The IP's strategy for stabilizing individual commodity agreements would involve the DCs in a range of problems and disputes among the LDCs, which is important in itself. Furthermore, the success of this strategy would determine the extent to which the IP would speed the development of the LDCs. The effect of the IP on development would, in turn, largely govern the extent to which it would promote international cooperation

This chapter attempts to knit conclusions reached in earlier chapters and politial considerations into an analysis of the IP. The first two sections discuss the political strategy of the IP and the third presents an assessment of the IP's prospects.

OPERATION OF THE IP's COMMODITY AGREEMENTS

The LDCs' objective is not simply to reduce period-to-period fluctuations in price and export earnings, and the commodity agreements envisioned by the IP are very different from pure buffer stocks. The IP's commodity agreements are designed to transfer

income to the LDCs via higher prices. The IP's commodity agreements would, then, face the problems of overshipping, disputes over market shares and entry.

It is at these problems that economic and political forces meet. While the point is seldom made explicitly, it is apparent that the IP would rely on political means -- in particular, the power of the DCs -- to deal with the problems that tend to destroy restrictive commodity agreements.[2] Part of the story -- which is postponed to the following section -- involves the Common Fund, and part takes place at the level of individual ICOs.

The IP's commodity agreements would employ a certificate system, enforced by buyers, to deal with overshipping. The system would work along the following lines. Export quotas would be negotiated each year and suppliers would be issued appropriately denominated stamps or certificates for a quantity equal to their quota. The certificates would be attached to the items exported. The importing nations would agree to refuse any material that did not have the appropriate certificates and evidence that the transaction was made at the agreed price. Enforcement of this agreement would rest directly with the importing nations' customs services.

Certificate systems are not so simple or as certain as they seem at first glance. For example, problems can arise when country A exports to country B via country C. There is a question as to whether overshipping in one period can be offset by undershipping in the next. A certificate system obviously sets up an opportunity for forgery,[3] and, beyond that markets tend to find imaginative ways

around restrictions.[4] Nevertheless, certificate systems have worked in the past. While a certificate system would not eliminate overshipping, there is a reasonable expectation that it would contain the problem within acceptable bounds.

Negotiation of export (or production) quotas would be a more difficult problem. There are a variety of grounds for disputes among suppliers over market shares. For example, country A may have only, say, 5 percent of current production, while a newly discovered ore field increases its share of known reserves to 10 percent. This new discovery will naturally lead country A to insist on a larger market share. Opening up of new lands (e.g. in Brazil) would have much the same effect. Changes in technology, or shifts in transportation costs, could favor some suppliers more than others, leading the favored group to seek an increase in its share of the market. Or a nation might find that production of coffee is more profitable than production of cotton and for that reason seek a larger share of the coffee market.

For the reasons pointed out in the preceding chapter, there is a presumption that disputes among existing suppliers over market shares are resolvable. However, perceptions of political and economic power can easily be faulty, negotiations have their limitations, and one or more suppliers may decide to withdraw from the agreement rather than accept a restriction on its share of the market. Historically, such decisions to "go it alone" are a common reason for the failure of cartels.

The option of withdrawing from the agreement, however, would always be less attractive if a thorough certificate system were in effect. The U.S., Japan and the EEC account for 80-90 percent of the imports of most of the relevant commodities. Given that the certificate system remains in force, a supplier that withdrew from the agreement would probably have difficulty finding a market. Hence, simply by adhering to the agreement, and enforcing the certificate system, the DCs would provide strong pressure for conflicts between suppliers over market shares to be resolved within the agreement.

Disputes between buyers and sellers are another matter. By accepting the IP in good faith, the DCs would explicitly commit themselves to price increases of some magnitude and commit themselves to the steps necessary to enforce those increases. But this would involve the DCs in some painful situations[5] and there would be limits to the DCs' willingness to support measures that work against their economic interests. These limits could eventually be defended by a threat to withdraw from the agreement. The credibility of the threat to withdraw from a particular agreement, however, would be constrained by a commitment to the IP as a whole and by some of the powers of the Common Fund. This point is pursued below. For the moment the conclusion is that the IP's commodity agreements in themselves do not have a good means for settling disputes between buyers and sellers.

The last, but most intractable problem is entry. Unimpeded entry would eventually force price down to the competitive level. However, this would not necessarily occur if the <u>rate</u> of entry were

limited. To the extent that demand expands over time, so does the output associated with the cartel price, and this growth would provide some room for entry.

A certificate system has the potential to block entry entirely, but an ICO probably could not, in fact, act systematically to prevent entry. It is much more plausible to suppose that a certificate system would be used to limit the rate of entry.[6] An entrant would have to apply for membership in the ICO and, in the course of doing so, negotiate a market share. It is in the suppliers' interest to prevent entry. Whether entry is accommodated by growth in demand or by yielding a part of the market, existing suppliers lose profits that they would obtain if entry were prevented. The buyers' interest is to encourage entry. Given these facts, the likely outcome is compromise. That is, the procedures associated with the certificate system could be used to delay entry, restrict entrants' initial size and limit their rate of growth.[7]

Such entry as occurs will nonetheless be painful and could destroy a restrictive agreement. This fact points towards one role of a buffer stock; in particular, there would be pressures to absorb supply from new entrants into the buffer stock. This suggestion may seem farfetched at first glance but, in terms of how events would unfold, it is not. Suppose that over the course of six months or a year, there is significant new entry while demand remains stable. Price would be bid down to the lower limit, which would automatically trigger purchases by the buffer stock. The fact that the price decline was triggered by entry rather than by a fall in

demand is clear evidence that the target price is "too high", in the sense that it is above the competitive level. The appropriate remedy then is to lower the target price (and not make further purchases). But this conclusion does not follow if the negotiated target price is judged to be "fair" and if the objective of the buffer stock is to defend that price. Given those assumptions, purchases by the buffer stock are warranted even though the price decline is caused by entry.

The extent of suppliers' enthusiam for using the buffer stock to cushion the effects of entry depends on how the buffer stock is financed. If the buffer stock were financed entirely by buyers, suppliers would be content to rely on the buffer stock to accommodate new entry. But suppliers would presumably pay a significant fraction of the costs of a buffer stock, and hence would see use of the buffer stock to cushion the effects of entry as an expensive solution. Furthermore, there is a limit to the size that the buffer stock could reach.

A certificate system and purchases by a buffer stock in many cases would not be sufficient to limit entry to the extent required to maintain price above the competitive level. The only other possibility for a solution would be in actions by the DCs. It is reasonable to p: edict, then, that entry would lead to pressures on the DCs to find some way to buy off entrants and/or compensate existing suppliers. However, <u>within the confines of a single commodity agreement</u>, such pressures are unlikely to be effective. It seems, then, that the individual ICOs would have available to them only relatively weak means for coping with entry.

The major purpose of this discussion has been to indicate the part that the DCs would play within individual ICOs in stabilizing the agreements. Their principal role would be to enforce a certificate system. Simply by joining an ICO, and enforcing a certificate system, the DCs would go far towards stabilizing a restrictive commodity agreement. Secondarily, the DCs would play a role by contributing to the costs of buffer stocks and finding ways to cushion the effects of entry.

THE COMMON FUND

The solution that has been described is not one with which the LDCs could be entirely comfortable. First, the IP's commodity agreements do not have reliable means for resolving disputes between buyers and sellers and dealing with entry. Second, only a few LDCs would be members of each ICO while virtually all of the DCs would belong. This would permit the DCs to act as a bloc and, if for no other reason, give them a large degree of influence over each ICO.[8] Third, the DCs have no direct economic incentive to support agreements designed to increase prices. While the DCs might be pursuaded to join restrictive agreements, it would be in their economic interest to let the agreements fail under the pressures of entry and the weight of accumulated disputes.

These comments provide the necessary background to a discussion of the Common Fund. At UNCTAD IV the LDCs made the Common Fund the central part of their position -- the sine qua non of an integrated program on commodities. The LDCs, in part, sought

the Common Fund as a power center. In this respect, the Common Fund proposal is the concrete form of the LDCs' insistance on an increased participation in international economic affairs. The LDCs would presumably play a dominant role in the Common Fund and hence could use it as a counterweight to the World Bank, the International Monetary Fund and lesser international economic agencies. The Common Fund would also have a strong bearing on individual commodity agreements. It is arguable that the Common Fund would correct the flaws in the solution, described above, to the problem of stabilizing commodity agreements.

This suggestion is difficult to pursue because the notion of the Common Fund is not well worked out. The description of the Common Fund contained in UNCTAD documents[9] is ambiguous and silent on some important points. Furthermore, there are competing conceptions of what a Common Fund should, or would, be.

A minimal Common Fund would be only a means for financing buffer stocks. A fund would initially be created by contributions from member nations. Individual buffer stocks would then draw from the fund to finance their purchases and pay back into the Fund when the stock was sold. As was explained in Chapter 4, a pooling arrangement of this sort can lower the amount of money required to maintain a system of buffer stocks.

At the other extreme, a maximal Common Fund would be the central management of a set of commodity agreements. The crucial managerial (or coordination of policy) problems are: determination of target prices, decisions on buffer stock operations, determination

of production and/or export quotas and control of entry. These matters would be dealt with within a maximal Common Fund rather than resolved by negotiation within individual ICO's. The notion of a maximal Common Fund would otherwise be meaningless. Under a maximal Common Fund, the administration of the individual commodity agreements would presumably be in the hands of a permanent staff, with a layer of political appointments at the head of each program (ICO) and a politically appointed top management. To this extent, the maximal Common Fund would bear a familial resemblance to the U.S. Department of Agriculture circa 1955. The Common Fund's management would be responsible to a governing body made up of the member nations or representatives of blocs of member nations.

The maximal version of the Common Fund could provide the LDCs with considerable leverage over the DCs. The source of this power would be political, not economic. The key point is simply that in a Common Fund the LDCs, as a group, would confront the DCs. Given that the LDCs maintain their cohesion, the stakes could be set at relations between the DCs and the LDCs. The DCs, then, would be attached to the IP by their broad interest in international stability and a range of lesser, specific political and economic concerns.[10]

If the problem of gaining the DCs' adherence could be solved in this way, the solutions to the other problems would follow readily. First, the LDCs' bargaining position would obviously be improved. If an issue is handled at the level of the Common Fund, rather than at the level of the ICO, it would be possible for the

LDCs as a bloc to confront the DCs as a bloc -- and to raise the stakes. Second, the DCs' political interest in the system as a whole would limit the extent to which they could pursue disputes with sellers within individual ICOs.

Finally the opportunities for log rolling inherent in a maximal Common Fund would make it easier to solve the problems of entry and disputes over market shares. Because the commitment to establish prices that are "fair to buyers and renumerative to producers" is open ended, the DCs would be under pressure to resolve these problems by somehow buying off one or another of the parties to the dispute. This might be done in an ad hoc way -- for example, by granting special trade concessions or loans.[11] Or a solution might be found by restructuring the agreement, along the lines of U.S. Agricultural programs, to make payment for reducing output below some predetermined level -- i.e., payment for each unit not produced.[12] Any Common Fund, and especially a maximal Common Fund, would afford much more variety in the sort of "deals" that could be arranged. The inducement on the DCs to find solutions would, again, be their political stake in the IP.

These comments point to the potential of a Common Fund. They do not necessarily describe the IP's Common Fund, which falls considerably short of the maximal form. But, although it would do that, the IP's Common Fund is more than a way of financing buffer stocks. It would, first, have the right to trade in commodities not covered by agreements. The Common Fund would then be an operating agency -- in effect, the manager of a series of buffer

stocks. Second, the IP's Common Fund would have the right to take the initiative in organizing commodity agreements.

The question posed by the character of the IP's Common Fund is whether it would play the crucial roles of the maximal Common Fund. To the extent that the problems of individual commodities would be decided at the level of the Common Fund, the answer is "yes". However, it is not clear how large a role the Common Fund would play in these issues. The Common Fund would have a significant degree of control over those ICO's that maintained buffer stocks and drew their financing from the Fund. But buffer stocks are likely to be the exception rather than the rule, and it would seem that an ICO that did not hold a buffer stock would have no formal relationship with the Common Fund. Presumably a web of close, but more or less informal, ties would grow up between the ICO's and the Common Fund. If this occurred, and the Common Fund obtained some political importance, it would be able to function as a permanent forum for commodities' problems and influence individual ICO's. In this respect it would perform, although imperfectly, the crucial roles of a maximal Common Fund.

This possibility, however, seems forlorn. It is unlikely that the informal influence that the IP's Common Fund could exercise would be of decisive importance. The means of control would at best be clumsy and erratic. Hence, as some form of central control would be required to maintain restrictive agreements, the IP would be unstable. While the system might not collapse, it would, under the pressure of events, either collapse or change drastically.

THE IP's PROSPECTS

An IP with a maximal Common Fund is not a realistic prospect in the foreseeable future. The relevant question then is: what would be the prospects of an IP along the lines of that considered at UNCTAD IV?

The adherence of the DCs would be vital to the success of an IP.[13] To an extent the DCs would be bound to an IP simply by an agreement to join, as a major international agency would not be lightly abandoned. But over the long term, the DCs would adhere to the IP only if the direct economic costs entailed were outweighed by political benefits -- especially, maintenance of international stability.

The other side of this coin is the effect of an IP on the LDCs. The IP is not intended to be a cosmetic measure, nor is it -- like the U.N. and UNCTAD -- essentially diplomatic in character. The LDCs in part seek the Common Fund as a power center, but the principal objective of the IP is to accelerate the economic growth of the LDCs. OPEC is to a large extent the model behind the IP. The LDCs hope to obtain, through the IP, the funds necessary to diversify and develop their economies. Success might promote stability in international relations but an ineffective IP could not be expected to do so.

Whether the IP would have a significant impact on development is then a major consideration. Suppose for the sake of the argument that the IP operates smoothly. As was mentioned earlier, the price increases instituted by OPEC increased the oil suppliers' profits

by about $80 billion in each of 1974, 1975 and 1976. Doubling the prices of the commodities in the IP -- and in some cases that would not be economic -- would yield additional revenues of only some $20 billion and these would be spread over a large population base (cf. Table 5-2, p. 132). The recipients would find the additional funds helpful, but they would not be sufficient to permit the massive development programs undertaken by the Middle Eastern oil producers. Furthermore, while some of the LDCs would gain under an IP, many others would lose. The predictable result, then, even under favorable assumptions, would be frustrated expectations.

This point is not worth pursuing in isolation because the supposition that the IP would operate smoothly is grossly unrealistic. Once it were instituted, the IP would be faced with the problems identified above. Frustration over the limited results of the IP would appear as one major theme in a broader pattern of failures and disputes.

General dissatisfaction with the IP, as well as some specific problems, would invariably give rise to pressures for "reform" of the system, especially of the Common Fund. First, problems that apparently call for the "coordination" of various commodity agreements would appear. For example, the ICOs that maintained buffer stocks and the Common Fund itself would be in competition for a limited amount of funds. Other circumstances that would suggest a need for coordination can also be imagined; e.g., the impact of aluminum prices on the demand for copper.

Second, the failure of individual agreements, or acute problems within ICOs would demonstrate the inadequacy of a minimal Common Fund. The tin buffer stock provides an example. During 1958, the International Tin Agreement was purchasing in an effort to maintain price, while at the same time the U.S.S.R. increased its exports of tin. This problem was solved when buyers, especially the U.K., imposed quotas on tin imports from the U.S.S.R. Similarly, in the early 1960's, the buyers in the International Coffee Agreement, including the U.S., limited imports from non-member nations.[14] But such one-at-a-time responses are likely to be cumbersome and unsatisfactory. It is reasonable to expect, then, that the IP's Common Fund would be under pressure to evolve towards the maximal form.[15]

Disappointment over the results of the IP would, finally, work in the same direction. Suppose that suppliers respond by successfully pressing for higher prices. This would reduce the quantity that could be sold and, after some point, higher prices would reduce the profits from sales to users. The higher prices would also encourage increased production and hence increase the amount that must be withheld from the market to maintain the higher prices. If this were done by production controls, the higher price would not increase profits. Consequently, there would be pressures to absorb the surpluses into buffer stocks or to develop methods to pay suppliers for not producing.

Once the objectives and logic of the IP are accepted, arguments such as those just sketched would have substantial appeal. In fact, they are correct in the sense that the IP would require a

central authority to stabilize the individual agreements. But the pressures that have been described would play the irresistible force to the Common Fund's immovable object. On the one hand, a successful IP would require a strong Common Fund. On the other hand, it seems very unlikely that a maximal Common Fund could be created or, if somehow created, could be stable.

The notion of a strong Common Fund involves (at least) two political contradictions. The first of these grows out of the role assigned to the DCs, which is something like that of a regulation. To maintain an effective system of restrictive agreements, the DCs would have to seek out ways, via the Common Fund, to solve a wide range of problems. Apart from any economic costs involved, the DCs, and especially the U.S., would be required to assume the diplomatic burdens of policing world trade in commodities. The DCs would not want this burden, and the LDCs would find the resulting balance of political power unattractive. Under an effective IP, many economic actions that individual LDCs might wish to undertake would be matters for negotiation, and hence would be subject to a significant measure of control by the DCs. Furthermore, if and when the DCs took steps to maintain an IP, they could be expected to insist on a corresponding degree of control. But such control would probably be intolerable to the LDCs and is the opposite of one of the results sought through the IP.[16]

The more important flaw in the notion of a strong Common Fund turns on the balance of economic and political costs to the DCs. One part of the burden on the DCs would be the required

contributions to the Common Fund and another would be the costs of higher commodity prices. While significant, these are probably not crucial in themselves. Contributions to the Common Fund could perhaps be justified as an aid measure and price increases, if accomplished slowly, might not be an issue in domestic politics. The intractable difficulties would grow out of the measures required to preserve a system of restrictive agreements -- imposition of controls on domestic producers, import quotas against the U.S.S.R. or other nations, etc. It would be very difficult to explain convincingly why the U.S. should incur political and diplomatic costs to support an international organization that works against the direct economic interests of U.S. consumers. The DCs could not be expected to support an IP on their own volation. The balancing force would be the political power of the LDCs and it seems very unlikely that this would be sufficient.

A strong Common Fund would not be required if the individual ICOs attempted to do no more than reduce period-to-period fluctuations in price. But the IP's commodity agreements are intended to increase the average level of prices, and this could be done for a substantial period only if there were a central authority with the capability of stabilizing the individual ICOs. The political flaws in the notion of a strong Common Fund, then, imply that the prospects of an IP along the lines of that endorsed by UNCTAD IV are dismal.

CONCLUSIONS

The conclusion of this discussion is that an IP would not

promote harmony between the DCs and the LDCs. The tragic flaw seems to be this. On the one hand, by accepting the IP, the DCs would commit themselves to speeding the LDCs' development with transfers created by higher commodity prices. On the other hand, the means included in the IP are insufficient to accomplish the task and the adequate means -- a strong Common Fund -- is not a practical possibility. While a weak Common Fund might survive for many years as an essentially defunct organization, the LDCs' expectations would eventually be frustrated by what would be called a failure of the DCs' "political will." This event, and the process of an IP's disintegration would be an important source of international acrimony.

FOOTNOTES TO CHAPTER 6

1. At UNCTAD IV, held in Nairobi in May 1976, the LDCs insisted on a Common Fund and on parallel negotiations of agreements for all of the products in the program.

2. This seems to be the meaning of statements to the effect that the creation and success of the IP require an exercise of "political will" by the DCs.

3. And would, say, West Germany be particularly enthusiastic about exposing a supplier whose offense is selling copper at less than the going price to West German auto producers?

4. Suppose, for example, that some country X is a relatively new, low cost cocoa producer, that has been given only a small export quota. X might well decide to go into the chocolate business. Then, say, British chocolate producers would have to buy relatively high cost cocoa while facing competition from low price imports from country X. They are very likely to cry "foul." Etc.

5. Suppose, for example, that an ICO in copper succeeds in substantially increasing price and, as a result, production is expanded and entry attracted. The initial response would be production controls. Now the U.S. is the world's largest

copper producer and if production controls were to be effective, U.S. producers would have to be included. A visible, direct and fairly immediate consequence would be unemployment of copper workers in the U.S. Could any administration explain why it supports an international organization whose actions reduce employment in the U.S. while increasing prices paid by U.S. consumers?

6. The policing of overshipping would not require centralized control as it would be enforced by individual buyers. Limiting the rate of entry would require conscious management by the ICO but, given that the certificate system is effective, this is a burden that the ICO could probably bear.

7. See I. Kravis, op. cit., pp. 310-311, for an example.

8. It is primarily informal influence that is referred to here. Voting procedures typically limit the amount of formal control that buyers can exercise. One common pattern, for example, requires agreement between buyers and sellers, with each groups' position determined by majority vote. Votes are usually allocated among buyers in proportion to purchases and among sellers in proportion to production or exports.

9. See especially UNCTAD, Trade and Development Board, "An Integrated Program for Commodities," TD/B/C.1/196, October 1975.

10. For a discussion of this point, see C. F. Bergson, "The Threat From the Third World," Foreign Policy 11 (1971): 102-124.

11. An example is provided by a situation that occurred in the copper industry. Early in November, 1965, the domestic copper producers increased their price to 38¢/lb. The increase was shortly thereafter rescinded to conform with guidepost policy. On October 20, Chile had forced an increase in the price of its copper to 38¢/lb. Most of Chile's output was produced by two U.S. firms -- Kennecott Copper and the Anaconda Company -- and it was apparently Chile's action that prompted the increase in the U.S. producers' price. The roll back put the U.S. producers in an awkward position, as they were taxed in Chile on the basis of the Chilean price. "Three months later, in officially separate actions, Chile agree to sell 100,000 tons in the U.S. at the producers' price of 36¢ and the U.S. government, through the Alliance for Progress agreed to lend Chile $10 million for forty years to use in copper development." Charles River Associates, Economic Analysis of the Copper Industry; report to the Property Management and Disposal Service, General Services Administration, March 1970, p. 170.

12. Given that the costs of the buffer stock had become large, the DCs might be led to favor this solution, for two reasons: (1) The amount that the DCs would contribute would be more predictable; and (2) The DCs' power vis-a-vis suppliers might be increased.

13. Without the DCs it would, first, be impossible to enforce a certificate system. Overshipping and disputes over market shares would then be much more intractable and the IP's means of limiting entry would be reduced. Second, the ability of the Common Fund to resolve conflicts among suppliers and to limit entry would be negligible unless the DCs participate, as otherwise the economic means and the political power are not there.

14. See Rowe, op. cit., p. 171-172 and Kravis, op. cit., p. 306.

15. It is a fairly reliable general rule that unsuccessful market intervention generates a demand for more and more stringent regulation. A classic example is provided by regulation of transportation in the U.S. Beginning in the 1930's, U.S. railroads, which are regulated by the Interstate Commerce Commission, faced increasing strong competition from trucking. The ostensible rationale for regulation of railroads was their monopolistic character. It might be expected, then, that the development of trucking would have lead to a reduction of regulation. Instead, most types of trucking were brought under the jurisdiction of the ICC. See D. Pegrum, Transportation: Economics and Public Policy (Irwin, 1968), pp. 339-340.

16. There is also a real possibility that an IP would increase the LDCs' dependence on commodities. To the extent that it creates additional profits, the IP would promote diversification. The

forces tending towards an increased, or maintained, reliance on commodities lie in the pattern of restrictions that would be associated with an effective IP. Once an IP was in place, buyers would face a pattern of production controls, export quotas, and limitations on entry enforced, via the ICOs, by the vested interests of existing suppliers. At a minimum, many of the LDCs would find their economic options reduced.

CHAPTER 7

ALTERNATIVES -- THE DOMESTIC CONNECTIONS

The LDCs have advocated adoption of a program along the lines of the IP for more than a decade. An IP has never been more than one issue among several, but during the past few years it has moved to the center of relations between the DCs and the LDCs. And the question, from the DCs' perspective, seems to have been set as: "The IP -- yes or no." The conclusion suggested by the preceding chapters is that the DCs should not accept an IP; it would not be in their direct economic interests to do so and an IP would not ultimately promote international stability.

Within the context of international relations, this decision would not be attractive in itself but only the lesser of the two evils. But why should the range of choice be so limited? Besides the reluctance to face unpleasant choices, the DCs are bound to a search for alternatives to the IP by the responsibility that they assumed for aiding the LDCs. The DCs could adopt the position that their commitment to aid the LDCs has reached its limit, and that in the future the LDCs must rely to a greater extent on their own efforts[1]. There is a measure of obvious reality in this position. Given the fact of nationalism and that development invariably disrupts existing social patterns, each of the LDCs must attempt to guide its own destiny. But as a response to the IP, "greater

self-reliance" seems hypocritical, as the DCs have on many occassions committed themselves to aiding the LDCs, and conceded that existing development assistance programs are inadequate.[2] More important, the DCs have an incentive to take collective actions which would reduce the danger of a confrontation with the LDCs.

There are economically feasible alternatives to the IP. In fact, in standard economic terms, the IP may be the worst program that could be imagined. This is quite widely understood. The difficulties lie in the dearth of what are judged to be "politically realistic" alternatives.

The New International Economic Order (NIEO) is perhaps the place to begin. The importance of the NIEO should not be exaggerated. The LDCs have divergent political predispositions and economic interests, and the positions of individual LDCs on particular issues may have no relationship to the programs supported by the LDCs as a bloc. Nevertheless, at the level of the dialogue between the DCs and the LDCs, it is reasonable to take the NIEO as an expression of the problems perceived by the LDCs and of their aspirations.

The NIEO indicates some hostility to investment by multi-national corporations and expresses substantial skepticism about the virtues of free trade in promoting development. These propositions point vaguely towards direct intervention in the commodity markets, but they are not crucial to the NIEO. The essentials of the NIEO seem to be: (1) economic independence for the LDCs -- i.e., the absence of domination of their domestic

economies by foreign firms; (2) removal of trade restrictions that discriminate against the LDCs; and (3) international efforts to speed the development of the LDCs.

These points, are not radical -- although the language used to express them often is -- and not controversial. The conflicts arise over the question of what is to be done. The easy course would be to sieze on the problem of instability in commodity prices and export earnings. If the matter is reduced to these terms, compensatory financing and/or pure buffer stocks seem to be appropriate remedies. Both may, in fact, have valuable roles to play, but they would not have a significant effect on development. Given that the pace of the LDCs' development is the real issue, there are three broad alternatives: (1) development assistance; (2) direct intervention in the commodity markets along the lines of the IP; and (3) reduction of existing barriers to trade.

The efficient way to transfer income to the LDCs is directly via grants or loans. This is so because direct transfers (i.e., development assistance) do not create inefficiencies which increase the cost of the transfer. However, it is now generally held that development assistance is not sufficient to produce self-sustaining growth in the LDCs.

The concensus that development assistance is an inadequate means of speeding development rests primarily on political rather than economic considerations. The LDCs argue that development assistance is unreliable, which is true at least to the extent that the level of aid provided by the DCs has tended to decline in

periods of recession. More important, the DCs, and especially the U.S., have not in recent years been willing to expand the level of development assistance.[3]

The disenchantment with development assistance also in part reflects the administrative and technical problems encountered by existing programs. These problems are significant -- development assistance is not a simple matter. But past programs have more often been governed by military and diplomatic goals rather than economic development, and the crucial problem is the level of assistance rather than technical and administrative difficulties. The proper response to the critics of development assistance may well be ". . . That it has never seriously been tried."[4] Development assistance should, then, be counted as an alternative to an IP.

The only other alternative to direct intervention in commodity markets is increased access to the markets of the DCs. This was basically the U.S. response to the IP. Specifically, the U.S. proposed: (1) reduction of tariff and non-tariff barriers to trade; and (2) measures to improve the LDCs' access to the capital markets of the DCs.[5]

The U.S. position is somewhat awkward in the light of the oft repeated commitment to assist the LDCs development. This commitment assumes implicitly that the market alone will not provide "sufficiently rapid" growth, whatever that is judged to be. As was pointed out in Chapter 1 (pp. 4-5), the LDCs are also skeptical about the ability of trade to promote development. Nevertheless, removal of trade barriers would be of substantial benefit to the

LDCs, and market access has ranked second only to commodity agreements in the dialogue between the DCs and the LDCs.

The LDCs face major tariff and non-tariff barriers to trade on two classes of goods. First, the DCs have acted to protect domestic production of certain agricultural commodities of interest to LDCs. For example, sugar production, is protected in the U.S. and the EEC countries. Second, semi-fabricated metal products (i.e., wire, rod, etc.) and many manufactured goods are protected by relatively high tariffs. These tariffs are not the only barrier to industrialization in the LDCs, but they make industrialization more difficult and in some cases are a crucial obstacle.

Removal of tariff and non-tariff barriers to trade would be to the advantage of both the LDCs and the DCs. For example, if the DCs stopped protecting their domestic sugar industries, production of sugar in the LDCs would increase; the price paid by consumers would fall and the direct costs of support programs would be saved; and the land and labor released by the decrease in sugar production in the DCs could be put to more productive uses. These pleasant results occur because trade barriers, like restrictive commodity agreements, are inefficient in the sense that the gains that they provide to some groups are less than the costs imposed on others.

It is true, however, that the removal of barriers to trade would hurt particular industries within the DCs. For that reason, the domestic politics of the DCs are likely to run counter to their national, and collective interest in removal of barriers to trade.

The DCs, to conclude, face a difficult situation. The IP has strong support from the LDCs as a bloc and, for that reason, cannot be brushed aside. One possible response would be a serious program of development assistance. This would be the most efficient course and would honor the DCs' commitment to aiding the LDCs. If development assistance is ruled out, the choices narrow to greater restrictions on trade, through the IP by whatever name, or a removal of existing barriers to trade. Which way the balance will tip depends to a large extent on what comes to be regarded as "politically realistic" within the DCs. The developed nations may, over the next decade or so, bargain away existing restrictions or they may accede to a more restrictive regime in international economic relations.

FOOTNOTES TO CHAPTER 7

1. Secretary of State Kissinger made essentially this point in the initial U.S. response to the IP.: "Developing countries themselves will have to provide most of the effort [required to accelerate economic growth] . . ." Kissinger, "Global Consensus," op. cit., p. 429.

2. In his speech to the U.N. General Assembly in September, 1975, Secretary of State Kissinger stated: "We have learned from experience that the methods of development assistance of the 1950's and 60's are no longer adequate." See Kissinger, Ibid, p. 427.

3. The U.S. has acknowledged this:

> But realistically, we cannot expect the level [of development assistance] to increase significantly over the coming years. To put it frankly, the political climate for bilateral aid has deteriorated. In the industrial countries, support for aid has been eroded by domestic economic slowdown, compounded by energy problems; in the developing countries, there is resentment at forms of assistance which imply dependence.

Kissinger, Ibid, p. 430.

4. G. Helleiner, ed. A World Divided (Cambridge University Press, 1976), p. 2.

5. Although billed a major initiative, this is the traditional U.S. response. In effect, the U.S. said: "We really mean it this time."